State of New Mexico
Oil Conservation Division

Incident ID	NRM2012856003
District RP	
Facility ID	
Application ID	

Site Assessment/Characterization

This information must be provided to the appropriate district office no later than 90 days after the release discovery date.

What is the shallowest depth to groundwater beneath the area affected by the release?	70 (ft bgs)
Did this release impact groundwater or surface water?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse?	☐ Yes ☒ No
Are the lateral extents of the release within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark)?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church?	☐ Yes ☒ No
Are the lateral extents of the release within 500 horizontal feet of a spring or a private domestic fresh water well used by less than five households for domestic or stock watering purposes?	☐ Yes ☒ No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring?	☐ Yes ☒ No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of a wetland?	☐ Yes ☒ No
Are the lateral extents of the release overlying a subsurface mine?	☐ Yes ☒ No
Are the lateral extents of the release overlying an unstable area such as karst geology?	☐ Yes ☒ No
Are the lateral extents of the release within a 100-year floodplain?	☐ Yes ☒ No
Did the release impact areas **not** on an exploration, development, production, or storage site?	☒ Yes ☐ No

Attach a comprehensive report (electronic submittals in .pdf format are preferred) demonstrating the lateral and vertical extents of soil contamination associated with the release have been determined. Refer to 19.15.29.11 NMAC for specifics.

Characterization Report Checklist: ***Each of the following items must be included in the report.***

- ☒ Scaled site map showing impacted area, surface features, subsurface features, delineation points, and monitoring wells.
- ☒ Field data
- ☒ Data table of soil contaminant concentration data
- ☒ Depth to water determination
- ☒ Determination of water sources and significant watercourses within ½-mile of the lateral extents of the release
- NA Boring or excavation logs
- ☒ Photographs including date and GIS information
- ☒ Topographic/Aerial maps
- ☒ Laboratory data including chain of custody

If the site characterization report does not include completed efforts at remediation of the release, the report must include a proposed remediation plan. That plan must include the estimated volume of material to be remediated, the proposed remediation technique, proposed sampling plan and methods, anticipated timelines for beginning and completing the remediation. The closure criteria for a release are contained in Table 1 of 19.15.29.12 NMAC, however, use of the table is modified by site- and release-specific parameters.

Form C-141
Page 4

State of New Mexico
Oil Conservation Division

Incident ID	NRM2012856003
District RP	
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I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: Elisabeth Klein Title: Directory, EHS Regulatory Compliance

Signature:  Date: 11/6/2020

email: lklein@3bearllc.com Telephone: (303) 882-4404

OCD Only

Received by: Cristina Eads Date: 02/09/2021

State of New Mexico
Oil Conservation Division

Incident ID	NRM2012856003
District RP	
Facility ID	
Application ID	

Closure

The responsible party must attach information demonstrating they have complied with all applicable closure requirements and any conditions or directives of the OCD. This demonstration should be in the form of a comprehensive report (electronic submittals in .pdf format are preferred) including a scaled site map, sampling diagrams, relevant field notes, photographs of any excavation prior to backfilling, laboratory data including chain of custody documents of final sampling, and a narrative of the remedial activities. Refer to 19.15.29.12 NMAC.

Closure Report Attachment Checklist: ***Each of the following items must be included in the closure report.***

[X] A scaled site and sampling diagram as described in 19.15.29.11 NMAC

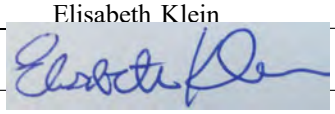
[X] Photographs of the remediated site prior to backfill or photos of the liner integrity if applicable (Note: appropriate OCD District office must be notified 2 days prior to liner inspection)

[X] Laboratory analyses of final sampling (Note: appropriate ODC District office must be notified 2 days prior to final sampling)

[X] Description of remediation activities

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations. The responsible party acknowledges they must substantially restore, reclaim, and re-vegetate the impacted surface area to the conditions that existed prior to the release or their final land use in accordance with 19.15.29.13 NMAC including notification to the OCD when reclamation and re-vegetation are complete.

Printed Name: Elisabeth Klein Title: Director, EHS Regulatory Compliance

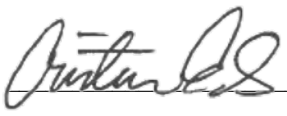
Signature:  Date: 11/6/2020

email: lklein@3bearllc.com . Telephone: (303) 882-4404 .

OCD Only

Received by: Cristina Eads Date: 02/09/2021

Closure approval by the OCD does not relieve the responsible party of liability should their operations have failed to adequately investigate and remediate contamination that poses a threat to groundwater, surface water, human health, or the environment nor does not relieve the responsible party of compliance with any other federal, state, or local laws and/or regulations.

Closure Approved by:  Date: 02/10/2021

Printed Name: Cristina Eads Title: Environmental Specialist

VERTEX

September 23, 2020 Vertex Project #: 20E-00504-002

Spill Closure Report: Grama Ridge East 34 State
Unit O, Section 34, Township 21 South, Range 34 East
County: Lea
API: 30-025-45624
Incident Tracking Number: NRM2012856003

Prepared For: 3 Bear Delaware Operating – NM, LLC
1512 Larimer Street, Suite 540
Denver, Colorado 80202

New Mexico Oil Conservation Division – District 1 – Hobbs
1625 North French Drive
Hobbs, New Mexico 88240

3 Bear Delaware Operating – NM, LLC (3 Bear) retained Vertex Resource Services Inc. (Vertex) to conduct a spill assessment and remediation for a crude oil release that occurred on March 5, 2020, at Chisholm Energy Operating, LLC (Chisholm's) Grama Ridge East 34 State, API 30-025-45624 (hereafter referred to as "Grama Ridge"). On March 6, 2020, 3 Bear provided 24-hour notification of the release to the New Mexico Oil Conservation Division (NM OCD) Bureau Chief, Jim Griswold, via voicemail, followed by email notification to NM OCD District 1. The initial C-141 Release Notification was submitted on May 7, 2020 (Attachment 1). The NM OCD tracking number assigned to this incident is NRM2012856003.

This letter provides a description of the spill assessment and remediation activities and demonstrates that closure criteria established in 19.15.29.12 *New Mexico Administrative Code* (NMAC; New Mexico Oil Conservation Division, 2018) have been met and all applicable regulations are being followed. This document is intended to serve as a final report to obtain approval from NM OCD for closure of this release.

Incident Description

On March 5, 2020, a release occurred at Chisholm's Grama Ridge site when a bull plug failed on one of 3 Bear's Lease Automatic Custody Transfer (LACT) units. This incident resulted in the release of approximately 34 barrels (bbls) of oil onto the Grama Ridge production wellpad and into the adjacent pasture. Upon discovery of the release, the LACT unit was repaired and a hydrovac truck was dispatched to the site to recover free-standing liquids. Approximately 32 bbls of oil were recovered from the impacted area and removed for disposal off-site. No oil was released into sensitive areas or waterways.

Site Characterization

The release at Grama Ridge occurred on privately-owned land, N 32.428570, W 103.454384, approximately 25 miles southwest of Hobbs, New Mexico. The legal description for the site is Unit O, Section 34, Township 21 South, Range 34 East, Lea County, New Mexico. This location is within the Permian Basin in southeast New Mexico and has historically

been used for oil and gas exploration and production. An aerial photograph and site schematic are included in Attachment 2 (Figure 1).

Grama Ridge is typical of oil and gas exploration and production sites in the western portion of the Permian Basin, and is currently used for oil and gas production, and storage. The following sections specifically describe the release area on the western side of the wellpad.

The surrounding landscape is associated with upland plains, alluvial fans and fan piedmonts typical in this area of elevations between 3,000 to 4,200 feet above sea level. The climate is semi-arid, with average annual precipitation ranging between 10 and 15 inches; the ecological classification is “Shallow Sandy”. Coarse surface soil textures, shallow soil depth and an overwhelming dominance by black grama distinguish this type of grassland site. Shrubs are sparse, though fire suppression, overgrazing and drought may facilitate an increase in the presence of shrubs, especially mesquite and creosotebush (United States Department of Agriculture, Natural Resources Conservation Service, 2020).

The *Geological Map of New Mexico* indicates the surface geology at Grama Ridge is comprised primarily of Qep – interlaid eolian sands and piedmont-slope deposits from the Holocene to middle Pleistocene ages (New Mexico Bureau of Geology and Mineral Resources, 2020). The National Resources Conservation Service Web Soil Survey describes the soil at the site as Simona fine sandy loam, which is characterized by a shallow layer of fine sandy loam and gravelly fine sandy loam over cemented material. It tends to be well-drained with very high runoff and very low available moisture levels in the soil profile (United States Department of Agriculture, Natural Resources Conservation Service, 2020). There is low potential for karst geology to be present near Grama Ridge, although some erosional karst may be possible (United States Department of the Interior, United States Geological Survey, 2020a).

There is no surface water located at Grama Ridge. The nearest significant watercourse, as defined in Subsection P of 19.15.17.7 NMAC, is the Pecos River located approximately 34 miles west-southwest of Grama Ridge (United States Fish and Wildlife Service, 2020). An intermittent riverine is located approximately 1 mile northeast of the release site and a small freshwater pond is located approximately 0.8 miles west. At Grama Ridge, there are no continuously flowing watercourses, lakebeds, sinkholes, playa lakes, or other critical water or community features as outlined in Paragraph (4) of Subsection C of 19.15.29.12 NMAC.

The nearest active well to the release is a New Mexico Office of the State Engineer well from 2007, located approximately 0.6 miles southwest of the release site. Depth to groundwater at this well is 70 feet below ground surface (bgs; New Mexico Office of the State Engineer, New Mexico Water Rights Reporting System, 2020). Although this well is located just outside of the preferred distance of 0.5 miles from the release site, as recommended in the *Procedures for Implementation of the Spill Rule* (19.15.29 NMAC; New Mexico Energy, Minerals and Natural Resources Department, 2019), a second well, located approximately 1.2 miles northwest of Grama Ridge, shows a similar depth to groundwater. This United States Geological Survey well is from 2015 and shows a depth to groundwater of approximately 62 feet bgs (United States Department of the Interior, United States Geological Survey, 2020b). Documentation pertaining to site characterization and depth to groundwater determination is included in Attachment 3.

Closure Criteria Determination

Using site characterization information, a closure criteria determination worksheet (Attachment 3) was completed to

determine if the release was subject to any of the special case scenarios outlined in Paragraph (4) of Subsection C of 19.15.29.12 NMAC.

Based on data included in the closure criteria determination worksheet, the release at Grama Ridge is not subject to the requirements of Paragraph (4) of Subsection C of 19.15.29.12 NMAC and the closure criteria for the site are determined to be associated with the following constituent concentration limits based on depth to groundwater.

Table 1. Closure Criteria for Soils Impacted by a Release

Depth to Groundwater	Constituent	Limit
51 ≤ 100 feet	Chloride	10,000 mg/kg
	TPH[1] (GRO + DRO + MRO)	2,500 mg/kg
	GRO + DRO	1,000 mg/kg
	BTEX[2]	50 mg/kg
	Benzene	10 mg/kg

[1]Total petroleum hydrocarbons (TPH) = gasoline range organics (GRO) + diesel range organics (DRO) + motor oil range organics (MRO)
[2]Benzene, toluene, ethylbenzene and xylenes (BTEX)

Initial Site Characterization

An initial spill inspection, completed on April 15, 2020, identified and mapped the boundaries of the release area using field screening methods, including the Petroflag system to assess the level of hydrocarbons and an electroconductivity (EC) meter to estimate chloride levels in the soil. The release area was determined to be approximately 100 feet long and 110 feet wide; the total affected area was determined to be 3,194 square feet (Attachment 1 – Figure 1). A selection of characterization soil samples was submitted to the laboratory for additional analysis to verify the initial field screening results. Field screening results and associated laboratory data are summarized in Table 2 (Attachment 4). The Daily Field Report (DFR) associated with the initial spill inspection is included in Attachment 5.

At the time of initial spill characterization and mapping, an in-situ hydrocarbon treatment product, Remediact, was applied across the impacted areas on-pad, where significant infrastructure might hamper excavation activities, as well as across the entirety of the off-pad portion of the release, to minimize impact on the undisturbed pasture. The areas treated with the in-situ product are presented on Figure 1 (Attachment 2) along with the characterization sampling locations, delineated release area and existing on-pad infrastructure.

Remedial Actions

Pad

On May 19, 2020, Vertex provided 48-hour notification of confirmation sampling, for the pad portion of the release, to NM OCD, as required by Subparagraph (a) of Paragraph (1) of Subsection D 19.15.29.12 NMAC (Attachment 6). Vertex was on-site on May 21, 2020, to guide the excavation of contaminated soils on-pad to an average depth of 1 foot bgs. Following remediation activities, Vertex collected a total of eight five-point composite confirmatory samples from the base and side walls of the excavation area.

Each composite sample was representative of no more than 200 square feet per the alternate sampling method outlined

in Subparagraph (c) of Paragraph (1) of Subsection D 19.15.29.12 NMAC, which does not require prior NM OCD approval. The composite samples were placed into laboratory provided containers, preserved on ice and submitted to a National Environmental Laboratory Accreditation Program-approved laboratory for chemical analysis.

Laboratory analyses included Method 300.0 for chlorides, Method 8021B for volatile organics, including BTEX, and EPA Method 8015 for TPH, including MRO, DRO and GRO. Confirmatory sampling analytical data are summarized in Table 3 (Attachment 4). Laboratory data reports and chain of custody forms are included in Attachment 7, and the DFR for the site visit is included in Attachment 5.

A GeoExplorer 7000 Series Trimble global positioning system (GPS) unit was used to map the approximate center of each of the five-point composite samples. The confirmatory sample locations are presented on Figure 2 (Attachment 2).

Of the eight confirmatory samples from the pad, two samples (BS20-11 and BS20-12) failed to meet NM OCD closure criteria. Following the required 48-hour notification (Attachment 6), on August 20, 2020, additional excavation was completed at those failed sample locations and the confirmatory samples were re-collected. The final laboratory results for these sample points are presented, along with the original results, in Table 3 (Attachment 4).

Remedial Actions

Pasture

Following the initial in-situ treatment on April 15, 2020, the pasture portion of the release was tilled, watered and re-treated with Remediact in June 2020 to ensure complete coverage and treatment of the contaminated soils.

On July 13, 2020, Vertex provided 48-hour notification of confirmation sampling, for the pasture portion of the release, as required by Subparagraph (a) of Paragraph (1) of Subsection D 19.15.29.12 NMAC (Attachment 6). Vertex was on-site on July 15, 2020, to collect an additional eight five-point composite confirmatory samples from the pasture portion of the release.

Each composite sample was representative of no more than 200 square feet per the alternate sampling method outlined in Subparagraph (c) of Paragraph (1) of Subsection D 19.15.29.12 NMAC, which does not require prior NM OCD approval. Each composite sample was field screened for TPH using the Petroflag and only the three confirmatory samples that showed contaminants of concern concentrations below closure criteria were submitted to the laboratory for analyses. The three passing composite samples were placed into laboratory provided containers, preserved on ice and submitted to a National Environmental Laboratory Accreditation Program-approved laboratory for chemical analysis.

Laboratory analyses included Method 300.0 for chlorides, Method 8021B for volatile organics, including BTEX, and EPA Method 8015 for TPH, including MRO, DRO and GRO. Confirmatory sampling analytical data are summarized in Table 3 (Attachment 4). Laboratory data reports and chain of custody forms are included in Attachment 7.

A GeoExplorer 7000 Series Trimble GPS unit was used to map the approximate center of each of the five-point composite samples. The confirmatory sample locations are presented on Figure 2 (Attachment 2).

Additional in-situ treatment and time were given to the failed portions of the pasture release and the failed confirmatory samples were re-collected on August 6, 2020, following the same protocols outlined above. The final laboratory results for these samples are presented, along with the remaining confirmatory samples, in Table 3 (Attachment 4).

Closure Request

Vertex recommends no additional remediation action to address the release at Grama Ridge. Laboratory analyses of final confirmatory samples showed constituent of concern concentration levels below NM OCD closure criteria for areas where depth to groundwater is between 50 and 100 feet bgs (Table 1). There are no anticipated risks to human, ecological or hydrological receptors associated with the release site.

Remediation efforts for the portion of the release that occurred on pasture land included a level of treatment sufficient to meet NM OCD restoration and reclamation requirements as outlined in 19.15.29.13 NMAC. As none of the pasture soil was removed, no backfill was required and the seedbank remained intact in the topsoil of the treated areas. Establishment of vegetation is expected to occur naturally with additional time and rainfall.

Vertex requests that this incident (NRM2012856003) be closed as all closure requirements set forth in Subsection E of 19.15.29.12 NMAC have been met. 3 Bear certifies that all information in this report and the attachments is correct, and that they have complied with all applicable closure requirements and conditions specified in Division rules and directives to meet NM OCD requirements to obtain closure on the March 5, 2020, release at Grama Ridge.

Should you have any questions or concerns, please do not hesitate to contact the undersigned at 505.506.0040 or ngordon@vertex.ca.

Sincerely,

Natalie Gordon
PROJECT MANAGER

Attachments

Attachment 1. NM OCD C-141 Report
Attachment 2. Figures
Attachment 3. Closure Criteria for Soils Impacted by a Release Research Determination Documentation
Attachment 4. Characterization and Confirmatory Sampling Field Screening and Laboratory Results
Attachment 5. Daily Field Report(s) with Photographs
Attachment 6. Required 48-hr Notification of Confirmation Sampling to Regulatory Agencies
Attachment 7. Laboratory Data Reports/Chain of Custody Forms

References

New Mexico Bureau of Geology and Mineral Resources. (2020). *Interactive Geologic Map.* Retrieved from http://geoinfo.nmt.edu.

New Mexico Energy, Minerals and Natural Resources Department. (2019). *Procedures for Implementation of the Spill Rule.* Santa Fe, New Mexico.

New Mexico Office of the State Engineer, New Mexico Water Rights Reporting System. (2020). *Water Column/Average Depth to Water Report.* Retrieved from http://nmwrrs.ose.state.nm.us/nmwrrs/waterColumn.html

New Mexico Oil Conservation Division. (2018). *New Mexico Administrative Code – Natural Resources and Wildlife Oil and Gas Releases*. Santa Fe, New Mexico.

United States Department of Agriculture, Natural Resources Conservation Service. (2020). *Web Soil Survey*. Retrieved from https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

United States Department of the Interior, United States Geological Survey. (2020a). *Caves and Karst in the U.S. National Park Service*. Retrieved from https://www.arcgis.com/home/webmap/viewer.html?webmap=14675403c37948129acb758138f2dd1e

United States Department of the Interior, United States Geological Survey. (2020b). *Groundwater for New Mexico: Water Levels*. Retrieved from https://nwis.waterdata.usgs.gov/nm/nwis/gwlevels?

United States Fish and Wildlife Service. (2020). *National Wetlands Inventory*. Retrieved from https://www.fws.gov/wetlands/data/Mapper.html

Limitations

This report has been prepared for the sole benefit of 3 Bear Delaware Operating – NM, LLC (3 Bear). This document may not be used by any other person or entity, with the exception of the New Mexico Oil Conservation Division, without the express written consent of Vertex Resource Services Inc. (Vertex) and 3 Bear. Any use of this report by a third party, or any reliance on decisions made based on it, or damages suffered as a result of the use of this report are the sole responsibility of the user.

The information and conclusions contained in this report are based upon work undertaken by trained professional and technical staff in accordance with generally accepted scientific practices current at the time the work was performed. The conclusions and recommendations presented represent the best judgement of Vertex based on the data collected during the assessment. Due to the nature of the assessment and the data available, Vertex cannot warrant against undiscovered environmental liabilities. Conclusions and recommendations presented in this report should not be considered legal advice.

ATTACHMENT 1

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources Department

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised August 24, 2018
Submit to appropriate OCD District office

Incident ID	NRM2012856003
District RP	
Facility ID	
Application ID	

Release Notification

Responsible Party

Responsible Party: 3 Bear Delaware Operating – NM, LLC	OGRID: 372603
Contact Name: Elisabeth Klein	Contact Telephone: (303) 882-4404
Contact email: lklein@3bearllc.com	Incident # *(assigned by OCD)*
Contact mailing address 1512 Larimer St. Suite 540, Denver, CO 80202	

Location of Release Source

Latitude 32.441984 Longitude -103.462966
(NAD 83 in decimal degrees to 5 decimal places)

Site Name: Chisholm's Grama Ridge East 34 State Site	Site Type: Central Tank Battery
Date Release Discovered: 3/5/2020	API# *(if applicable)*:

Unit Letter	Section	Township	Range	County
D	34	T21S	R34E	Lea

Surface Owner: ☒ State ☐ Federal ☐ Tribal ☐ Private (*Name: 3Bear*)

Nature and Volume of Release

Material(s) Released (Select all that apply and attach calculations or specific justification for the volumes provided below)

☒ Crude Oil	Volume Released (bbls) Approximately 34 bbls	Volume Recovered (bbls) Approximately 32 bbls
☐ Produced Water	Volume Released (bbls)	Volume Recovered (bbls)
	Is the concentration of dissolved chloride in the produced water >10,000 mg/l?	☐ Yes ☐ No
☐ Condensate	Volume Released (bbls)	Volume Recovered (bbls)
☐ Natural Gas	Volume Released (Mcf)	Volume Recovered (Mcf)
☐ Other (describe)	Volume/Weight Released (provide units)	Volume/Weight Recovered (provide units)
Cause of Release: Work was completed on a 3Bear Energy LACT at Chisholm's site and a bull plug failed.		

State of New Mexico
Oil Conservation Division

Incident ID	NRM2012856003
District RP	
Facility ID	
Application ID	

Was this a major release as defined by 19.15.29.7(A) NMAC? ☒ Yes ☐ No	If YES, for what reason(s) does the responsible party consider this a major release? The spill was 34 bbls in volume.

If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)?
On March 6, 2020, 3Bear Energy found the spill occurred and that the spill occurred due to an open valve on our oil LACT at the Chisholm site and was identified as the Grama South East site (it is the Grama Ridge East 34 site). Elisabeth Klein, 3Bear Energy, left a voicemail for Jim Griswold describing the spill on March 6th and followed up with an email to Jim Griswold, Ramona Marcus and emnrd-ocd-district1spills@state.nm.us on March 6th.

Initial Response

The responsible party must undertake the following actions immediately unless they could create a safety hazard that would result in injury

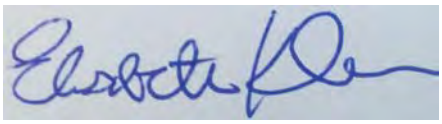
☒ The source of the release has been stopped.
☒ The impacted area has been secured to protect human health and the environment.
☒ Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices.
☒ All free liquids and recoverable materials have been removed and managed appropriately.

If all the actions described above have not been undertaken, explain why:

Per 19.15.29.8 B. (4) NMAC the responsible party may commence remediation immediately after discovery of a release. If remediation has begun, please attach a narrative of actions to date. If remedial efforts have been successfully completed or if the release occurred within a lined containment area (see 19.15.29.11(A)(5)(a) NMAC), please attach all information needed for closure evaluation.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: Elisabeth Klein Title: Director, EHS Regulatory Compliance

Signature:  Date: 5/7/2020

email: lklein@3bearllc.com Telephone: (303) 882-4404

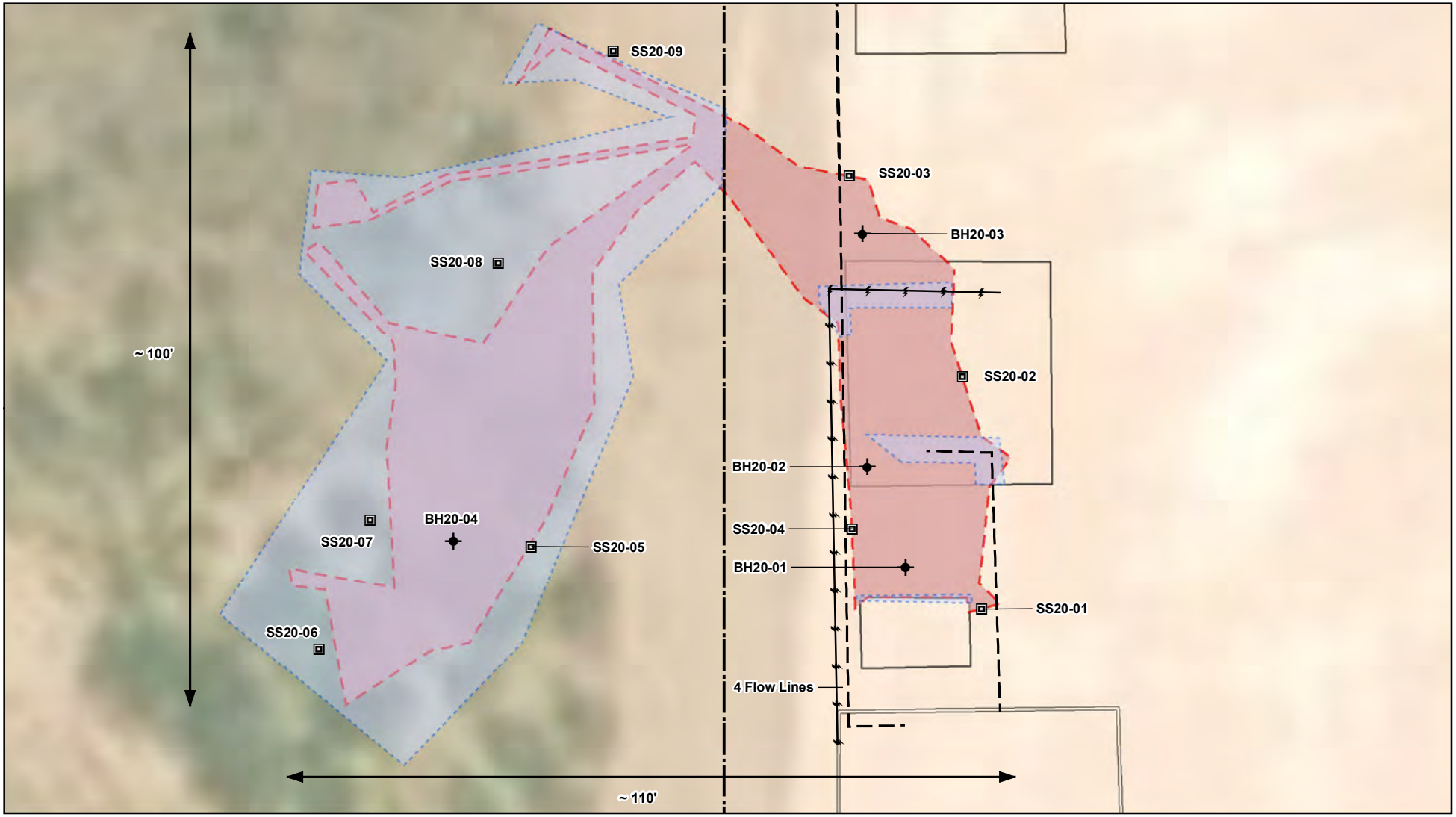
State of New Mexico
Oil Conservation Division

Incident ID	NRM2012856003
District RP	
Facility ID	
Application ID	

OCD Only

Received by: Ramona Marcus Date: 5/7/2020

ATTACHMENT 2



Borehole
Surface Sample
Electrical Line
Flow Line
Approximate Lease Boundary
Battery Containment
Infrastructure (Existing)
Approximate Spill Extent (~ 3,194 sq.ft.)
Remediact Placement

VERTEX

0 5 10 20 ft

Map Center:
Lat/Long: 32.428570, -103.454384

NAD 1983 UTM Zone 13N
Date: Apr 21/20

N

Site Schematic and Characterization
Sampling Locations
Grama Ridge East 34 State

FIGURE:
1

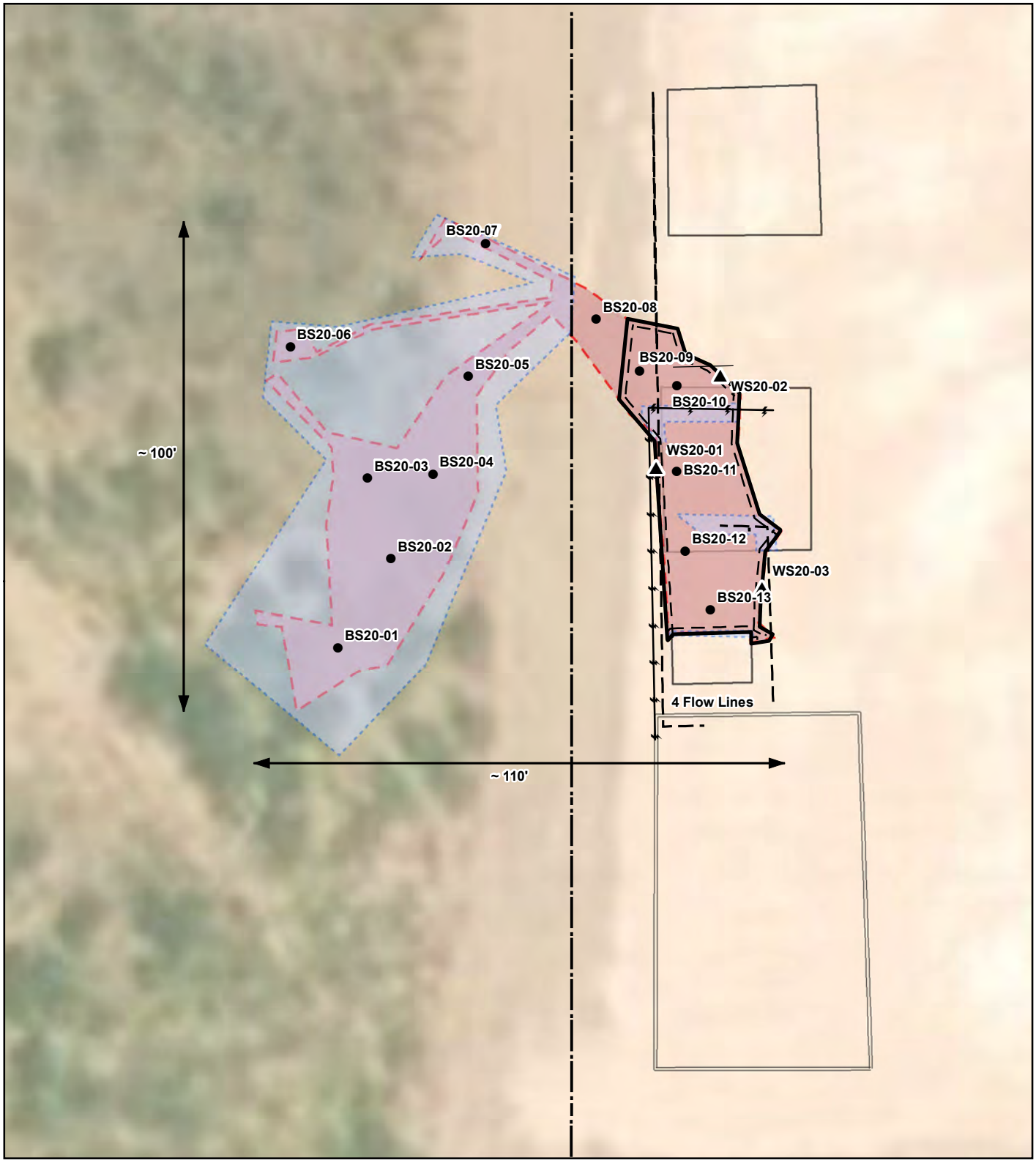
3Bear Energy

Geospatial data presented in this figure may be derived from external sources and Vertex does not assume any liability for inaccuracies. This figure is intended for reference use only and is not certified for legal, survey, or engineering purposes.

Note: Imagery from ESRI. 2017.

VERSATILITY. EXPERTISE.

Document Path: G:\1-Projects_US PROJECTS\3 Bear Energy LLC\20E-00504002 - Grama Ridge East 34 State 2BS 006H\Figure 1 Grama Ridge East 34 State 2BS.mxd



- Base Sample (Excavated)
- Wall Sample (Excavated)
- Excavation
- Electrical Line
- Flow Line
- Battery Containment
- Approximate Lease Boundary
- Infrastructure (Existing)
- Approximate Spill Extent (~ 3,194 sq.ft.)
- Remediact Placement

VERTEX

0 5 10 20 ft.

NAD 1983 UTM Zone 13N
Date: May 26/20

Map Center:
Lat: 32.428522,
Long:-103.454423

N

Confirmatory Sampling Locations
Grama Ridge East 34 State

FIGURE: 2

3Bear Energy

Geospatial data presented in this figure may be derived from external sources and Vertex does not assume any liability for inaccuracies. This figure is intended for reference use only and is not certified for legal, survey, or engineering purposes.

Note: Imagery from ESRI, 2017.

VERSATILITY. EXPERTISE.

Document Path: G:\1-Projects_US PROJECTS\3 Bear Energy LLC\20E-000504002 - Grama Ridge East 34 State 2BS 006H\Figure 2 Grama Ridge East 34 State 2BS Confirmatory.mxd

Client Name: 3 Bear Delaware Operating - NM, LLC
Site Name: Grama Ridge East 34 State
NM OCD Incident Tracking Number: NRM2012856003
Project #: 20E-00504-002
Lab Report: 2004817

Table 2. Characterization Sampling Field Screening and Laboratory Results - Depth to Groundwater 50 ≤ 100 feet bgs

Sample Description			Field Screening			Petroleum Hydrocarbons							Inorganic
						Volatile		Extractable					
Sample ID	Depth (ft)	Sample Date	Volatile Organic Compounds (PID)	Extractable Organic Compounds (Petro Flag)	Inorganics (Quantab - High/Low)	Benzene	BTEX (Total)	Gasoline Range Organics (GRO)	Diesel Range Organics (DRO)	Motor Oil Range Organics (MRO)	(GRO + DRO)	Total Petroleum Hydrocarbons (TPH)	Chloride
			(ppm)	(ppm)	(ppm)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)
BH20-01	0	April 15, 2020	-	-	187	-	-	-	-	-	-	-	-
BH20-01	0.5	April 15, 2020	-	159	87	-	-	-	-	-	-	-	-
BH20-01	1	April 15, 2020	-	27	152	-	-	-	-	-	-	-	-
BH20-01	2	April 15, 2020	-	-	165	-	-	-	-	-	-	-	-
BH20-02	0	April 15, 2020	-	-	55	<1.2	53.8	950	25,000	11,000	**25,950**	**36,950**	<60
BH20-02	0.5	April 15, 2020	-	-	25	-	-	-	-	-	-	-	-
BH20-02	1	April 15, 2020	-	**EE**	32	-	-	-	-	-	-	-	-
BH20-02	2	April 15, 2020	-	-	35	-	-	-	-	-	-	-	-
BH20-02	2.5	April 15, 2020	-	53	142	<0.025	<0.222	<4.9	<9.4	<47	<14.3	<61.3	<60
BH20-02	3	April 15, 2020	-	-	67	-	-	-	-	-	-	-	-
BH20-03	0	April 15, 2020	-	-	87	-	-	-	-	-	-	-	-
BH20-03	0.5	April 15, 2020	-	175	-7	-	-	-	-	-	-	-	-
BH20-03	1	April 15, 2020	-	62	114	<0.025	<0.225	<5.0	15	<47	15	15	<60
BH20-03	2	April 15, 2020	-	-	-9	-	-	-	-	-	-	-	-
BH20-04	0	April 15, 2020	-	-	-	-	-	-	-	-	-	-	-
BH20-04	0.5	April 15, 2020	-	56	-	-	-	-	-	-	-	-	-
BH20-04	1	April 15, 2020	-	-	-	-	-	-	-	-	-	-	-
BH20-04	2	April 15, 2020	-	-	-	-	-	-	-	-	-	-	-
SS20-01	0	April 15, 2020	-	277	432	-	-	-	-	-	-	-	-
SS20-01	0.5	April 15, 2020	-	31	368	<0.025	<0.221	<4.9	<9.9	<50	<14.8	<64.8	100
SS20-02	0	April 15, 2020	-	533	312	-	-	-	-	-	-	-	-
SS20-02	0.5	April 15, 2020	-	28	250	-	-	-	-	-	-	-	-
SS20-03	0	April 15, 2020	-	-	526	-	-	-	-	-	-	-	-
SS20-03	0.5	April 15, 2020	-	24	337	<0.025	<0.225	<5.0	<9.8	<49	<14.8	<63.8	140
SS20-04	0	April 15, 2020	-	76	302	-	-	-	-	-	-	-	-
SS20-04	0.5	April 15, 2020	-	-	244	-	-	-	-	-	-	-	-
SS20-05	0	April 15, 2020	-	379	-	-	-	-	-	-	-	-	-
SS20-05	0.5	April 15, 2020	-	72	-	-	-	-	-	-	-	-	-
SS20-06	0	April 15, 2020	-	99	-	-	-	-	-	-	-	-	-
SS20-06	0.5	April 15, 2020	-	44	-	-	-	-	-	-	-	-	-
SS20-07	0	April 15, 2020	-	98	-	-	-	-	-	-	-	-	-
SS20-07	0.5	April 15, 2020	-	78	-	<0.025	<0.225	<5.0	14	<44	14	14	<60
SS20-08	0	April 15, 2020	-	71	-	-	-	-	-	-	-	-	-
SS20-08	0.5	April 15, 2020	-	-	-	-	-	-	-	-	-	-	-
SS20-09	0	April 15, 2020	-	18	-	-	-	-	-	-	-	-	-
SS20-09	0.5	April 15, 2020	-	-	-	<0.024	<0.219	<4.9	<9.2	<46	<14.1	<60.1	<60

"-" Not sampled/analyzed
Bold and shaded indicates exceedance outside of NM OCD closure criteria

Client Name: 3 Bear Delaware Operating - NM, LLC
Site Name: Grama Ridge East 34 State
NM OCD Incident Tracking Number: NRM2012856003
Project #: 20E-00504-002
Lab Reports: 2005A40, 2007899, 2008429 and 2008C42

Table 3. Confirmatory Sampling Laboratory Results - Depth to Groundwater 51 ≤ 100 feet bgs

Sample Description			Field Screening			Petroleum Hydrocarbons							Inorganic
						Volatile		Extractable					
Sample ID	Depth (ft)	Sample Date	Volatile Organic Compounds (PID)	Extractable Organic Compounds (Petro Flag)	Inorganics (Electroconductivity)	Benzene	BTEX (Total)	Gasoline Range Organics (GRO)	Diesel Range Organics (DRO)	Motor Oil Range Organics (MRO)	(GRO + DRO)	Total Petroleum Hydrocarbons (TPH)	Chloride
			(ppm)	(ppm)	(ppm)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Pasture													
BS20-01	0	August 6, 2020	-	75	-	<0.024	<0.216	<4.8	<9.7	<49	<14.5	<63.5	<59
BS20-02	0	August 6, 2020	-	86	-	<0.024	<0.220	<4.9	<9.8	<49	<14.7	<63.7	<60
BS20-03	0	August 6, 2020	-	79	-	<0.025	<0.221	<4.9	<9.7	<49	<14.6	<63.6	<60
BS20-04	0	July 15, 2020	-	55	-	<0.023	<0.208	<4.6	<10	<50	<14.6	<64.6	120
BS20-05	0	August 6, 2020	-	77	-	<0.025	<0.221	<4.9	<9.7	<49	<14.6	<63.6	<60
BS20-06	0	July 15, 2020	-	227	-	<0.023	<0.213	<4.6	<9.1	<46	<13.7	<59.7	<60
BS20-07	0	August 6, 2020	-	70	-	<0.023	<0.208	<4.6	<8.8	<44	<13.4	<57.4	<60
BS20-08	0	July 15, 2020	-	75	-	<0.025	<0.221	<4.9	17	<46	17	17	250
Pad													
BS20-09	0.5	May 21, 2020	-	595	-	<0.12	<1.11	<25	650	300	650	950	<60
BS20-10	0.5	May 21, 2020	-	187	-	<0.12	<1.07	<24	320	120	320	440	<60
BS20-11	1.5	May 21, 2020	-	1,169	-	<0.12	<1.11	63	1,500	600	**1,563**	2,163	2,500
BS20-11	2	August 20, 2020	-	-	-	<0.024	<0.216	<4.8	18	62	**18**	80	180
BS20-12	1	May 21, 2020	-	940	-	<0.12	<1.07	92	1,300	470	**1,392**	1,862	61
BS20-12	1.5	August 20, 2020	-	-	-	<0.024	<0.216	<4.8	26	70	**26**	96	160
BS20-13	0.5	May 21, 2020	-	835	-	<0.12	<1.04	<23	460	320	460	780	1,990
WS20-01	0-0.5	May 21, 2020	-	201	-	<0.025	<0.222	<4.9	16	<42	16	16	430
WS20-02	0-0.5	May 21, 2020	-	58	-	<0.023	<0.207	<4.6	<8.9	<45	<13.5	<58.5	110
WS20-03	0-0.5	May 21, 2020	-	70	-	<0.024	<0.216	<4.8	30	<46	30	30	240

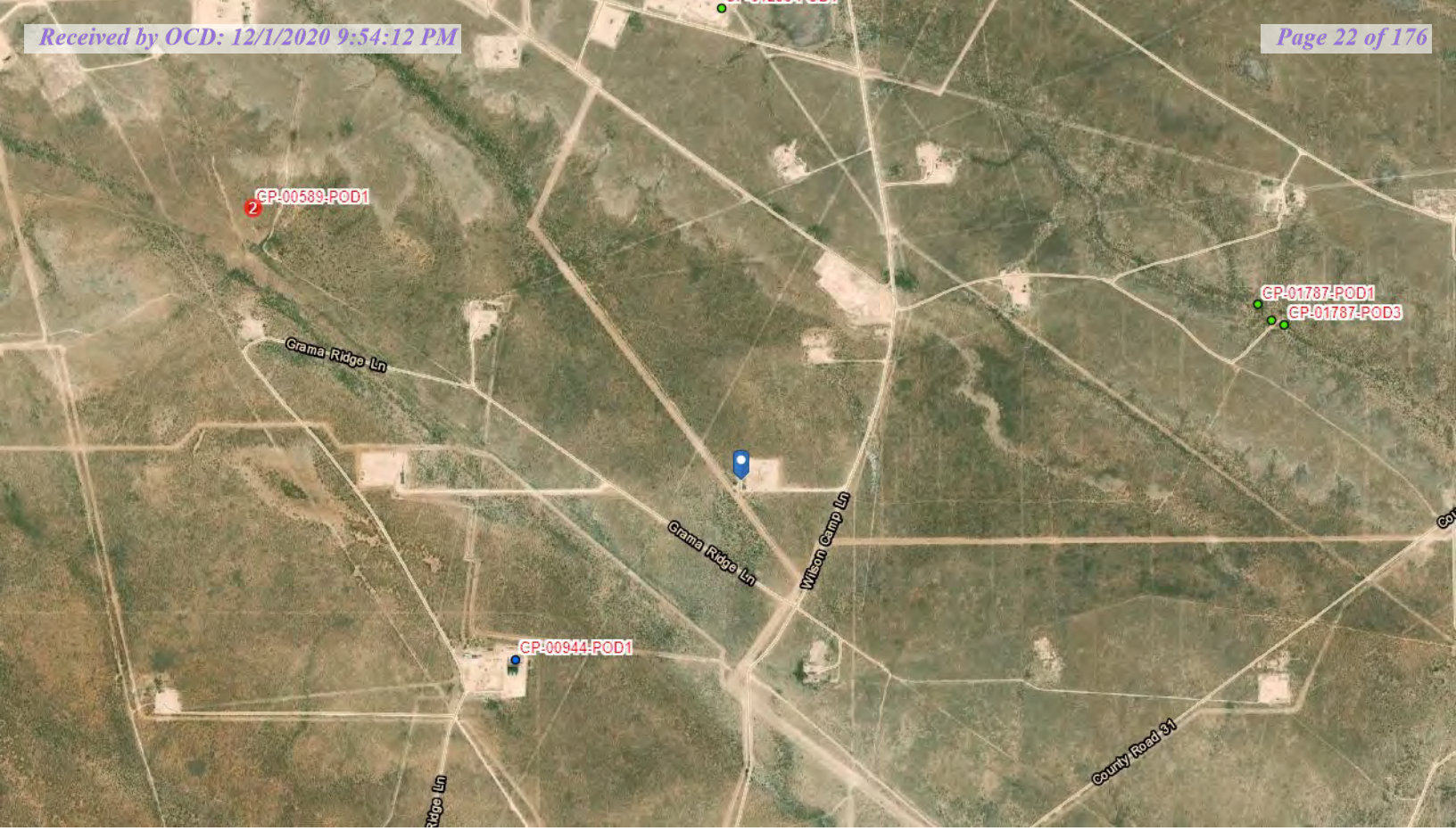
"-" - Not applicable/assessed

Bold and grey shaded indicates exceedance outside of NM OCD closure criteria

Bold and green shaded indicates re-sample of prior exceedance outside of NM OCD closure criteria

ATTACHMENT 3

Closure Criteria Worksheet			
Site Name: Grama Ridge East 34 State			
Spill Coordinates:		X: 32.428570	Y: -103.454384
Site Specific Conditions		Value	Unit
1	Depth to Groundwater	**70.00**	feet
2	Within 300 feet of any continuously flowing watercourse or any other significant watercourse	5,280	feet
3	Within 200 feet of any lakebed, sinkhole or playa lake (measured from the ordinary high-water mark)	4,259	feet
4	Within 300 feet from an occupied residence, school, hospital, institution or church	14,758	feet
5	i) Within 500 feet of a spring or a private, domestic fresh water well used by less than five households for domestic or stock watering purposes, **or**		feet
	ii) Within 1000 feet of any fresh water well or spring	3,231	feet
6	Within incorporated municipal boundaries or within a defined municipal fresh water field covered under a municipal ordinance adopted pursuant to Section 3-27-3 NMSA 1978 as amended, unless the municipality specifically approves	No	(Y/N)
7	Within 300 feet of a wetland	5,094	feet
8	Within the area overlying a subsurface mine	No	(Y/N)
9	Within an unstable area (Karst Map)	Low	Critical High Medium Low
10	Within a 100-year Floodplain	Undetermined	year
NMAC 19.15.29.12 E (Table 1) Closure Criteria		>100'	<50' 51-100' >100'


CP-00589-POD1
2
Grama Ridge Ln
CP-01787-POD1
CP-01787-POD3
Grama Ridge Ln
Wilson Camp Ln
CP-00944-POD1
County Road 31

New Mexico Office of the State Engineer

Point of Diversion Summary

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest) (NAD83 UTM in meters)

Well Tag	POD Number	Q64	Q16	Q4	Sec	Twp	Rng	X	Y
	CP 00934	2	1	2	01	22S	34E	648682	3588822

Driller License: 1188 **Driller Company:** SCARBOROUGH DRILLING INC.

Driller Name: SCARBOROUGH, LANE (LD)

Drill Start Date: 09/01/2005 **Drill Finish Date:** 09/01/2005 **Plug Date:**

Log File Date: 09/15/2005 **PCW Rcv Date:** **Source:** Shallow

Pump Type: **Pipe Discharge Size:** **Estimated Yield:**

Casing Size: 4.00 **Depth Well:** 60 feet **Depth Water:** 42 feet

Casing Perforations:	Top	Bottom
	40	60

Meter Number: 9046 **Meter Make:** HAYS

Meter Serial Number: 29607592 **Meter Multiplier:** 1.0000

Number of Dials: 6 **Meter Type:** Diversion

Unit of Measure: Gallons **Return Flow Percent:**

Usage Multiplier: **Reading Frequency:** Quarterly

Meter Readings (in Acre-Feet)

Read Date	Year	Mtr Reading	Flag	Rdr	Comment	Mtr Amount	Online
10/12/2005	2005	0	A	jw		0	
11/19/2005	2005	0	A	RPT	new meter installed	0	
12/01/2005	2005	5975	A	RPT		0.018	
01/31/2006	2005	18289	A	RPT		0.038	
02/28/2006	2006	16993	R	RPT	Meter Rollover	0.303	
03/31/2006	2006	19766	A	RPT		0.009	
04/30/2006	2006	27085	A	RPT		0.022	

05/31/2006	2006	31936	A	RPT		0.015
05/31/2006	2006	319360	A	RPT	Changed number of dials to 6	0
07/31/2006	2006	213485	R	RPT	Meter Rollover	2.744
08/31/2006	2006	274617	A	RPT		0.188
09/30/2006	2006	324955	A	RPT	Final reading not available	0.154
10/31/2006	2006	0	A	RPT	Initial reading	0
10/31/2006	2006	33355	A	RPT		0.102
11/30/2006	2006	83596	A	RPT		0.154
12/31/2006	2006	83596	A	RPT		0
01/31/2007	2007	22623	R	RPT	Meter Rollover	2.882
06/30/2007	2007	115003	A	RPT		0.353
06/30/2007	2007	0	A	RPT	Initial reading	0
07/31/2007	2007	166292	A	RPT		0.157
08/31/2007	2007	214288	A	RPT		0.147
09/30/2007	2007	263699	A	RPT		0.152
10/31/2007	2007	313375	A	RPT		0.152
11/30/2007	2007	360848	A	RPT		0.146
12/31/2007	2007	385197	A	RPT		0.075
05/31/2008	2008	385197	A	RPT		0
06/30/2008	2008	385197	A	RPT		0
07/31/2008	2008	385197	A	RPT		0
10/31/2008	2008	385197	A	RPT		0
11/30/2008	2008	385197	A	RPT		0
02/28/2009	2009	385197	A	RPT		0
03/31/2009	2009	385215	A	RPT		0
04/30/2009	2009	385215	A	RPT		0
05/31/2009	2009	385215	A	RPT		0

**YTD Meter Amounts:	Year	Amount
	2005	0.056
	2006	3.691
	2007	4.064
	2008	0
	2009	0

9/11/20 3:05 PM POINT OF DIVERSION SUMMARY

New Mexico Office of the State Engineer

Point of Diversion Summary

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest) (NAD83 UTM in meters)

Well Tag	POD Number	Q64	Q16	Q4	Sec	Twn	Rng	X	Y
	CP 00944 POD1	3	1		03	22S	34E	644531	3588351

Driller License: 1456 **Driller Company:** WHITE DRILLING COMPANY

Driller Name: WHITE, JOHN W

Drill Start Date: 03/05/2007 **Drill Finish Date:** 03/05/2007 **Plug Date:**

Log File Date: 03/22/2007 **PCW Rcv Date:** **Source:** Shallow

Pump Type: **Pipe Discharge Size:** **Estimated Yield:**

Casing Size: 5.00 **Depth Well:** 109 feet **Depth Water:** 70 feet

Water Bearing Stratifications:	Top	Bottom	Description
	62	72	Other/Unknown

Casing Perforations:	Top	Bottom
	57	97

New Mexico Office of the State Engineer

Point of Diversion Summary

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest) (NAD83 UTM in meters)

Well Tag	POD Number	Q64	Q16	Q4	Sec	Twn	Rng	X	Y
	CP 01068 POD1	4	1	4	28	21S	34E	643609	3591005

Driller License: 421 **Driller Company:** GLENN'S WATER WELL SERVICE

Driller Name: GLENN, CLARK A."CORKY" (LD)

Drill Start Date:	03/10/2012	**Drill Finish Date:**	03/12/2012	**Plug Date:**	
Log File Date:	03/22/2012	**PCW Rcv Date:**	07/10/2017	**Source:**	Shallow
Pump Type:	SUBMER	**Pipe Discharge Size:**	3	**Estimated Yield:**	40 GPM
Casing Size:	6.21	**Depth Well:**	180 feet	**Depth Water:**	140 feet

Water Bearing Stratifications:	Top	Bottom	Description
	140	170	Shallow Alluvium/Basin Fill

Meter Number:	18284	**Meter Make:**	BLANCETT
Meter Serial Number:	112 211 501	**Meter Multiplier:**	100.0000
Number of Dials:	9	**Meter Type:**	Diversion
Unit of Measure:	Barrels 42 gal.	**Return Flow Percent:**	
Usage Multiplier:		**Reading Frequency:**	Quarterly

Meter Readings (in Acre-Feet)

Read Date	Year	Mtr Reading	Flag	Rdr	Comment	Mtr Amount	Online
10/31/2016	2016	385137	A	ap		0	
12/31/2016	2016	385137	A	ap		0	
02/01/2017	2017	385137	A	ap		0	
03/01/2017	2017	385137	A	ap		0	
04/01/2017	2017	385137	A	ap		0	
05/01/2017	2017	385137	A	ap		0	
05/31/2017	2017	385137	A	ap		0	

06/30/2017	2017	385137	A	ap	0
07/31/2017	2017	385137	A	ap	0
10/31/2017	2017	385137	A	ap	0
11/30/2017	2017	431733	A	ap	600.591
12/30/2017	2017	435668	A	ap	50.720
01/30/2018	2018	435668	A	ap	0
02/28/2018	2018	435668	A	ap	0
03/30/2018	2018	435668	A	ap	0
04/30/2018	2018	435668	A	ap	0
06/01/2018	2018	491172	A	ap	715.409
06/29/2018	2018	506094	A	ap	192.335
07/31/2018	2018	508597	A	ap	32.262
08/30/2018	2018	524812	A	ap	209.000
09/30/2018	2018	527544	A	ap	35.214
11/30/2018	2018	532789	A	ap	67.605
03/01/2019	2019	564338	A	ap	406.645
04/01/2019	2019	564452	A	ap	1.469
05/01/2019	2019	585456	A	ap	270.727
05/31/2019	2019	589950	A	ap	57.925
06/30/2019	2019	594245	A	ap	55.360
10/31/2019	2019	643103	A	ap	629.747
06/01/2020	2020	716193	A	RPT	942.081

x

**YTD Meter Amounts:	Year	Amount
	2016	0
	2017	651.311
	2018	1251.825
	2019	1421.873
	2020	942.081

x

National Water Information System: Web Interface

USGS Water Resources

Data Category: Groundwater | Geographic Area: United States | GO

Click to hideNews Bulletins

- Introducing The Next Generation of USGS Water Data for the Nation
- **NOTICE 09-08-2020: The NWIS Mapper is experiencing intermittent issues. Developers are looking into the problem. Thank you for your patience.**
- Full News

Groundwater levels for the Nation

Search Results -- 1 sites found

site_no list =

- 322556103282401

Minimum number of levels = 1

Save file of selected sites to local disk for future upload

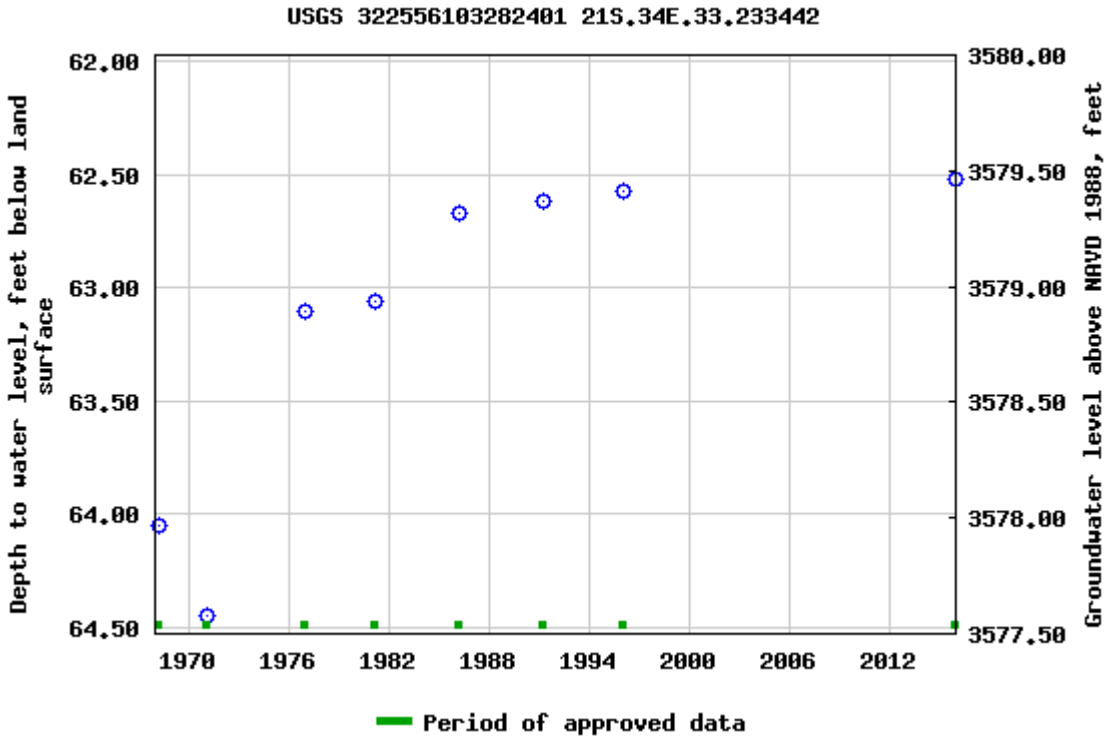
USGS 322556103282401 21S.34E.33.233442

Available data for this site | Groundwater: Field measurements | GO

Lea County, New Mexico
Hydrologic Unit Code 13070007
Latitude 32°26'10.1", Longitude 103°28'22.7" NAD83
Land-surface elevation 3,642 feet above NAVD88
The depth of the well is 92 feet below land surface.
This well is completed in the Ogallala Formation (121OGLL) local aquifer.

Output formats

Table of data
Tab-separated data
Graph of data
Reselect period



Breaks in the plot represent a gap of at least one year between field measurements.
Download a presentation-quality graph

Questions about sites/data?
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Data Tips
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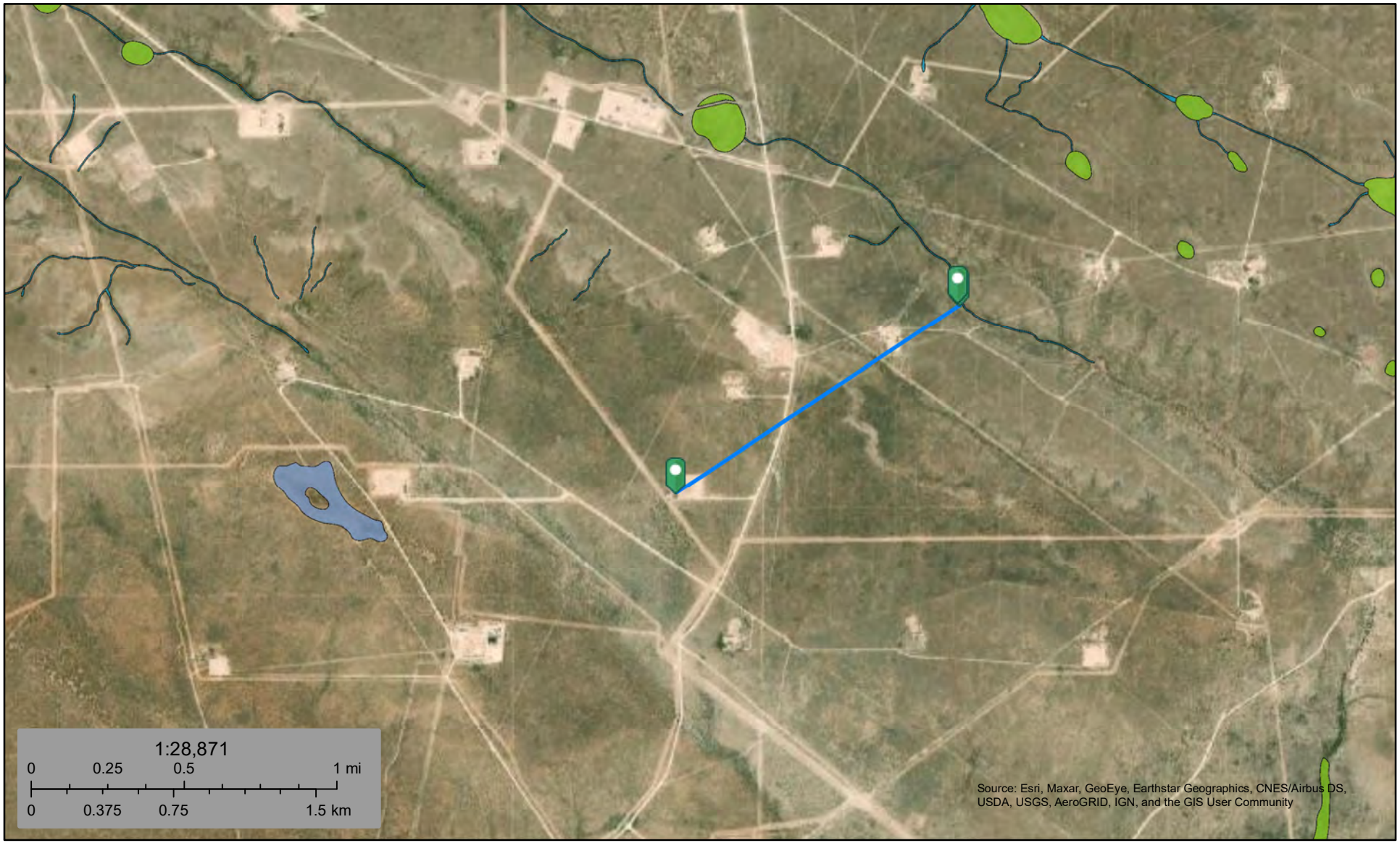
U.S. Department of the Interior | U.S. Geological Survey

Title: Groundwater for USA: Water Levels
URL: https://nwis.waterdata.usgs.gov/nwis/gwlevels?

Page Contact Information: USGS Water Data Support Team
Page Last Modified: 2020-09-11 17:29:48 EDT
0.59 0.5 nadww02

U.S. Fish and Wildlife Service
National Wetlands Inventory

2 Grama Ridge East 34 State Nearest Rive



September 11, 2020

Wetlands

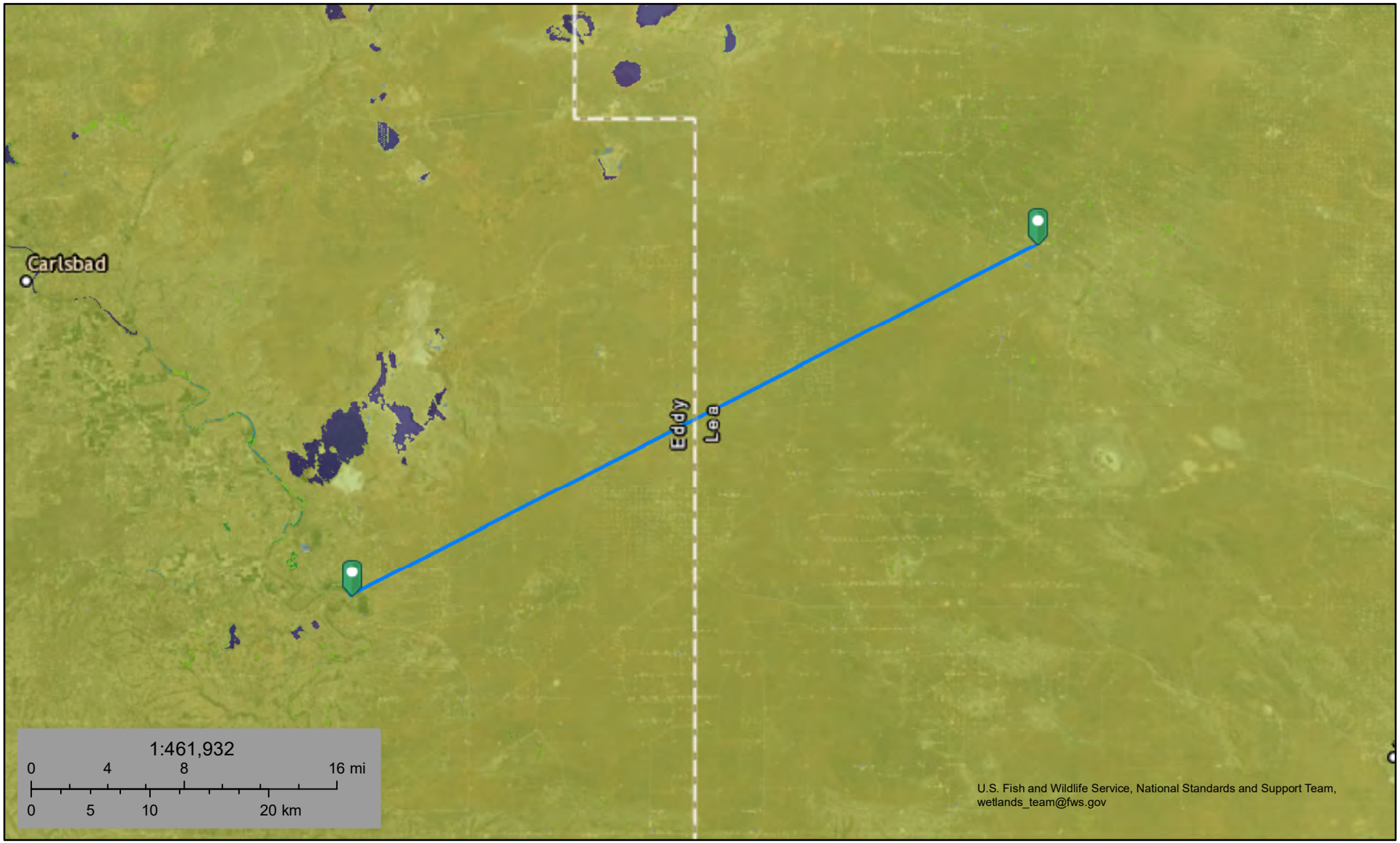
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

U.S. Fish and Wildlife Service
National Wetlands Inventory

Grama Ridge 34 Watercourse 180,211 ft



May 15, 2020

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

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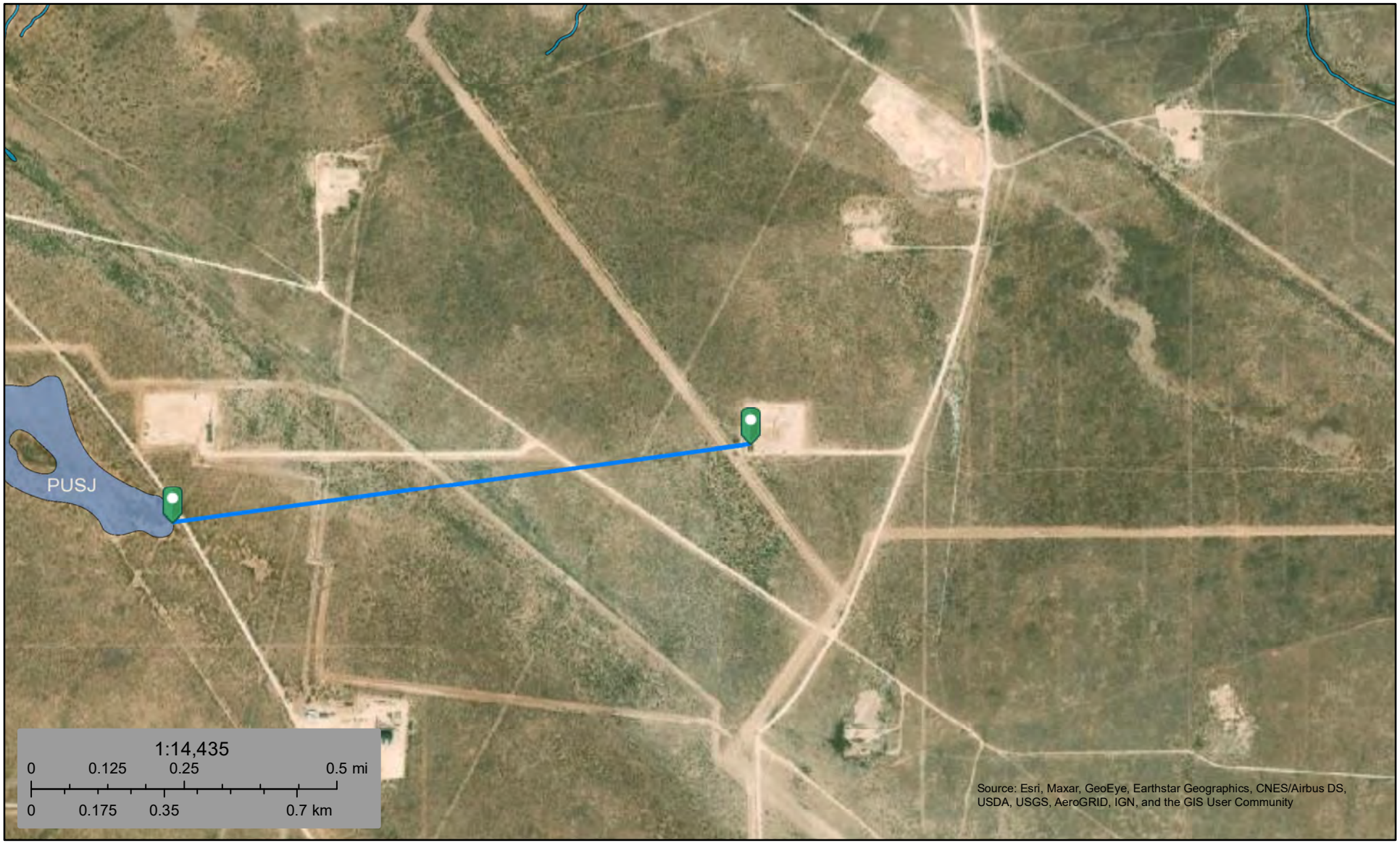
National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

U.S. Fish and Wildlife Service

National Wetlands Inventory

3 Grama Ridge East 34 State Nearest Pon



September 11, 2020

Wetlands

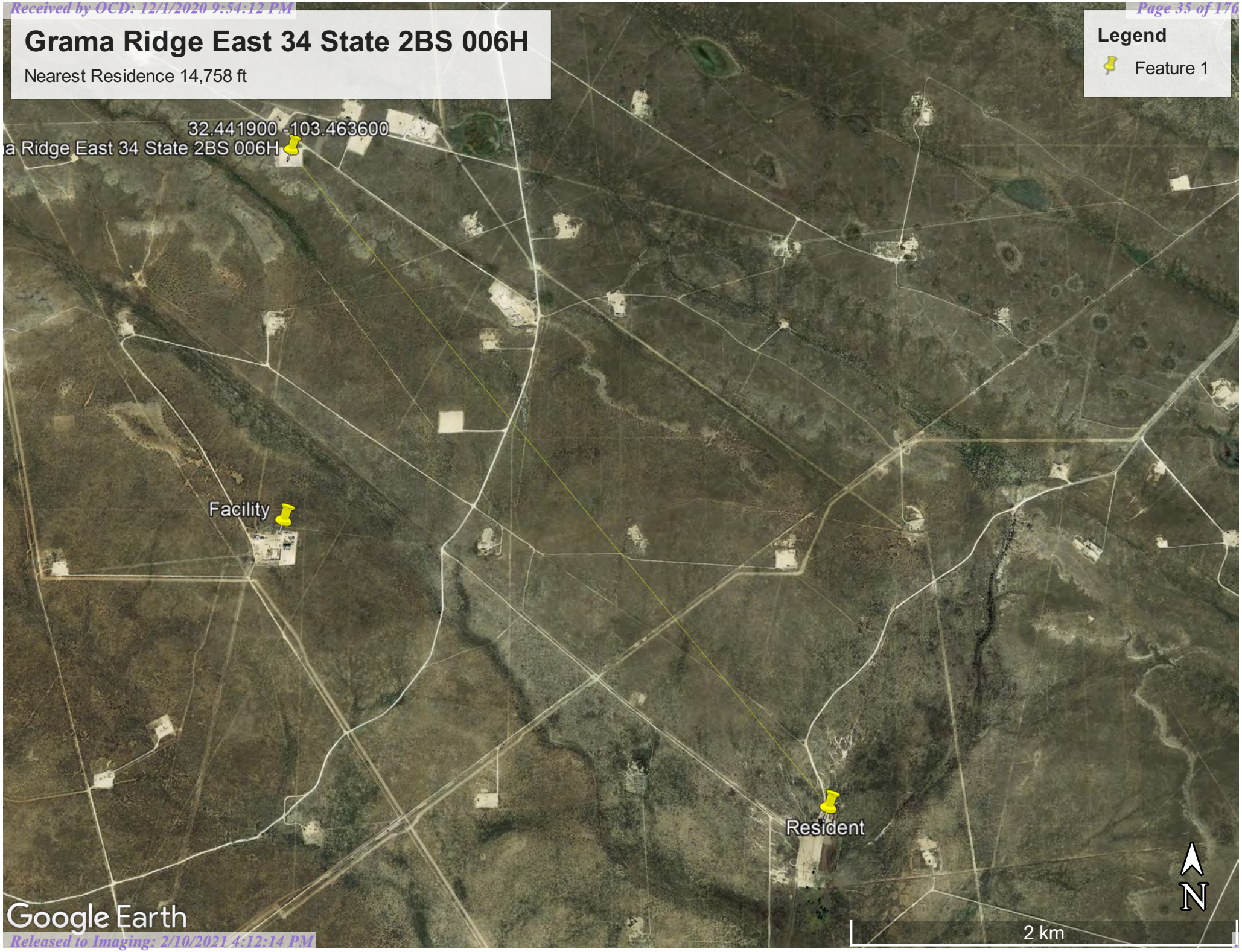
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

Grama Ridge East 34 State 2BS 006H

Nearest Residence 14,758 ft



New Mexico Office of the State Engineer

Active & Inactive Points of Diversion

(with Ownership Information)

(acre ft per annum)

(R=POD has been replaced and no longer serves this file, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(NAD83 UTM in meters)

WR File Nbr	Sub basin	Use	Diversion	Owner	County	POD Number	Well Tag	Code	Grant	Source	q q q 6416 4	Sec	Tws	Rng	X	Y	Distance
CP 01253	CP	PRO	0	CAZA OPERTING LLC	LE	CP 01253 POD1					4 3 4	27	21S	34E	645222	3590642	815
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CP 01068	CP	STK	3	GLENN'S WATER WELL SVC, INC.	LE	CP 01068 POD1				Shallow	4 1 4	28	21S	34E	643609	3591005	985
CP 01081	CP	PRO	0	TD WATER SERVICES	LE	CP 01068 POD1				Shallow	4 1 4	28	21S	34E	643609	3591005	985
CP 01082	CP	PRO	0	TONYA'S PERMIT SERVICE	LE	CP 01068 POD1				Shallow	4 1 4	28	21S	34E	643609	3591005	985
CP 01083	CP	PRO	0	GLENN'S WATER WELL SRVC, INC.	LE	CP 01068 POD1				Shallow	4 1 4	28	21S	34E	643609	3591005	985
CP 01186	CP	COM	200	MERCHANT LIVESTOCK CO	LE	CP 01068 POD1				Shallow	4 1 4	28	21S	34E	643609	3591005	985
CP 01217	CP	PRO	0	COG OPERATING	LE	CP 01068 POD1				Shallow	4 1 4	28	21S	34E	643609	3591005	985
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CP 01186	CP	COM	200	MERCHANT LIVESTOCK CO	LE	CP 01069 POD1				Shallow	2 1 4	28	21S	34E	643737	3591191	1007

***UTM location was derived from PLSS - see Help**

(acre ft per annum)

(R=POD has been replaced and no longer serves this file, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(NAD83 UTM in meters)

WR File Nbr	Sub basin	Use	Diversion	Owner	County	POD Number	Well Tag	Code	Grant	Source	q 6416	q 4	q	Sec	Tws	Rng	X	Y	Distance
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CP 01242	CP	PRO	0	COG OPERATING	LE	CP 01069 POD1				Shallow	2	1	4	28	21S	34E	643737	3591191	1007
CP 01440	CP	COM	150	ATKINS ENGR ASSOC INC	LE	CP 01069 POD1				Shallow	2	1	4	28	21S	34E	643737	3591191	1007
CP 00571	CP	STK	3	POGO PRODUCING COMPANY	LE	CP 00571 POD1				Shallow	3	1	4	28	21S	34E	643499	3591063	1109
CP 01041	CP	PRO	0	TD WATER SERVICES	LE	CP 00571 POD1				Shallow	3	1	4	28	21S	34E	643499	3591063	1109
CP 01054	CP	PRO	0	YATES PETROLEUM	LE	CP 00571 POD1				Shallow	3	1	4	28	21S	34E	643499	3591063	1109
CP 01062	CP	PRO	0	GLENN'S WATER WELL SRVC, INC.	LE	CP 00571 POD1				Shallow	3	1	4	28	21S	34E	643499	3591063	1109
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CP 01186	CP	COM	200	ATKINS ENGR ASSOC INC	LE	CP 01066 POD1				Shallow	4	3	2	28	21S	34E	643735	3591345	1126
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CP 01246	CP	PRO	0	COG OPERATING	LE	CP 01066 POD1				Shallow	4	3	2	28	21S	34E	643735	3591345	1126

(acre ft per annum)

(R=POD has been replaced and no longer serves this file, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(NAD83 UTM in meters)

WR File Nbr	Sub basin	Use	Diversion	Owner	County	POD Number	Well Tag	Code Grant	Source	q 6416	q 4	q	Sec	Tws	Rng	X	Y	Distance
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CP 01186	CP	COM	200	MERCHANT LIVESTOCK CO	LE	CP 01067 POD1			Shallow	1	3	4	28	21S	34E	643446	3591434	1384
CP 01271	CP	PRO	0	GMT EXPLORATION	LE	CP 01067 POD1			Shallow	1	3	4	28	21S	34E	643446	3591434	1384
CP 01272	CP	PRO	0	GMT EXPLORATION	LE	CP 01067 POD1			Shallow	1	3	4	28	21S	34E	643446	3591434	1384
CP 01273	CP	PRO	0	GLENNS WATER WELL SERVICE,INC	LE	CP 01067 POD1			Shallow	1	3	4	28	21S	34E	643446	3591434	1384
CP 01440	CP	COM	150	ATKINS ENGR ASSOC INC	LE	CP 01067 POD1			Shallow	1	3	4	28	21S	34E	643446	3591434	1384
CP 01091	CP	STK	3	GLENN'S WATER WELL SERVICE	LE	CP 01091 POD1			Shallow	3	3	2	28	21S	34E	643446	3591434	1384
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CP 01140	CP	PRO	0	COG OPERATING	LE	CP 01091 POD1			Shallow	3	3	2	28	21S	34E	643446	3591434	1384
CP 01186	CP	COM	200	ATKINS ENGR ASSOC INC	LE	CP 01091 POD1			Shallow	3	3	2	28	21S	34E	643446	3591434	1384
CP 01233	CP	PRO	0	COG OPERATING	LE	CP 01091 POD1			Shallow	3	3	2	28	21S	34E	643446	3591434	1384
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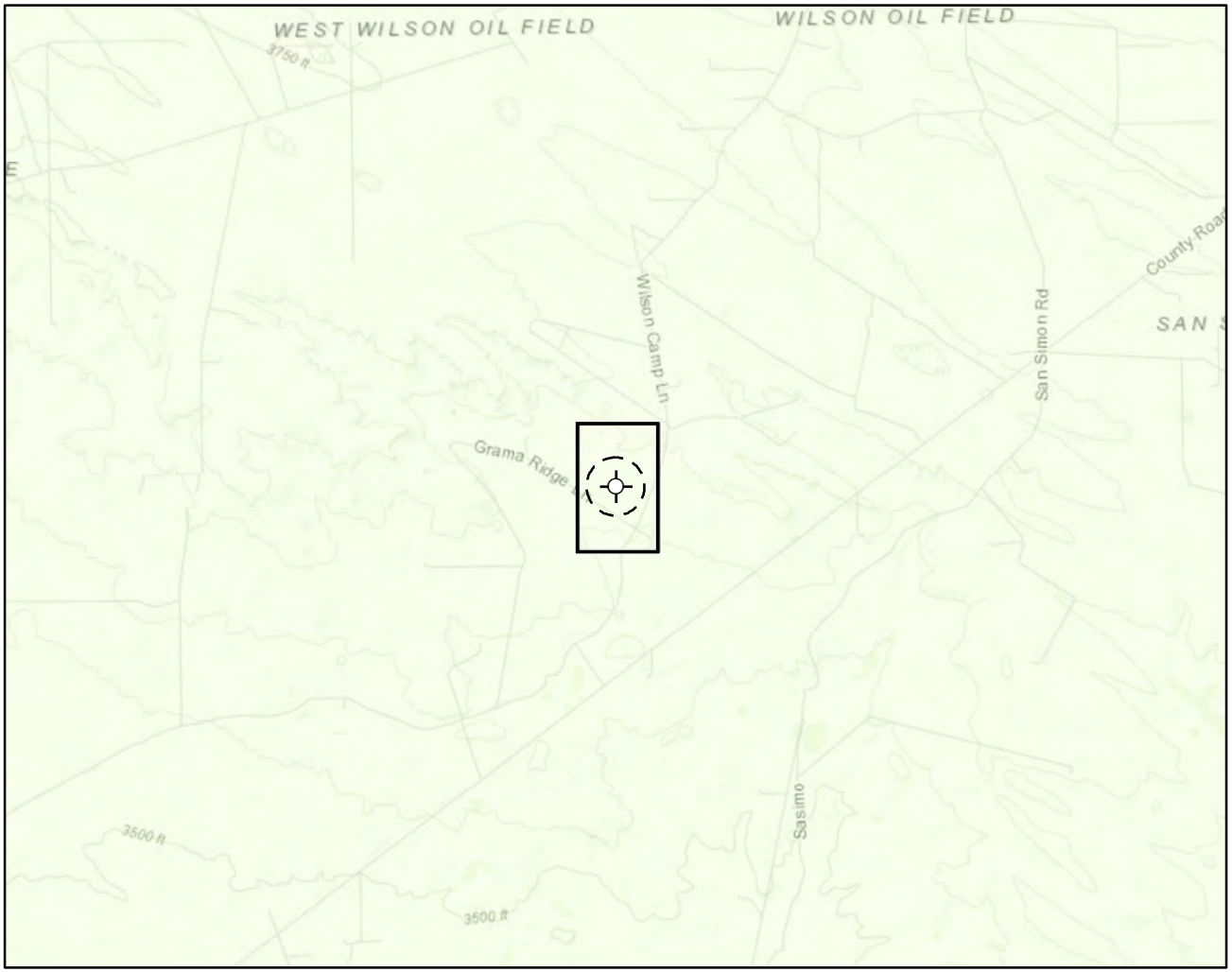
CP 01440	CP	COM	150	MERCHANT LIVESTOCK CO	LE	CP 01091 POD1			Shallow	3	3	2	28	21S	34E	643446	3591434	1384

Record Count: 58

UTMNAD83 Radius Search (in meters):

Easting (X): 644428.26 **Northing (Y):** 3590457.63 **Radius:** 1610

Sorted by: Distance



Karst Potential

- Critical
- High
- Medium
- Low

- Site
- Site_Buffer - 1000 ft.

Overview Map

0 0.25 0.5 1 mi

Detail Map

0 150 300 600 ft.

VERTEX

Map Center:
Lat/Long: 32.428627, -103.454486

NAD 1983 UTM Zone 13N
Date: May 15/20

N

Karst Potential
Grama Ridge East 34 State 2BS

FIGURE:
X

3Bear Energy

Geospatial data presented in this figure may be derived from external sources and Vertex does not assume any liability for inaccuracies. This figure is intended for reference use only and is not certified for legal, survey, or engineering purposes.

Note: Inset Map, ESRI 20XX; Overview Map: ESRI World Topographic

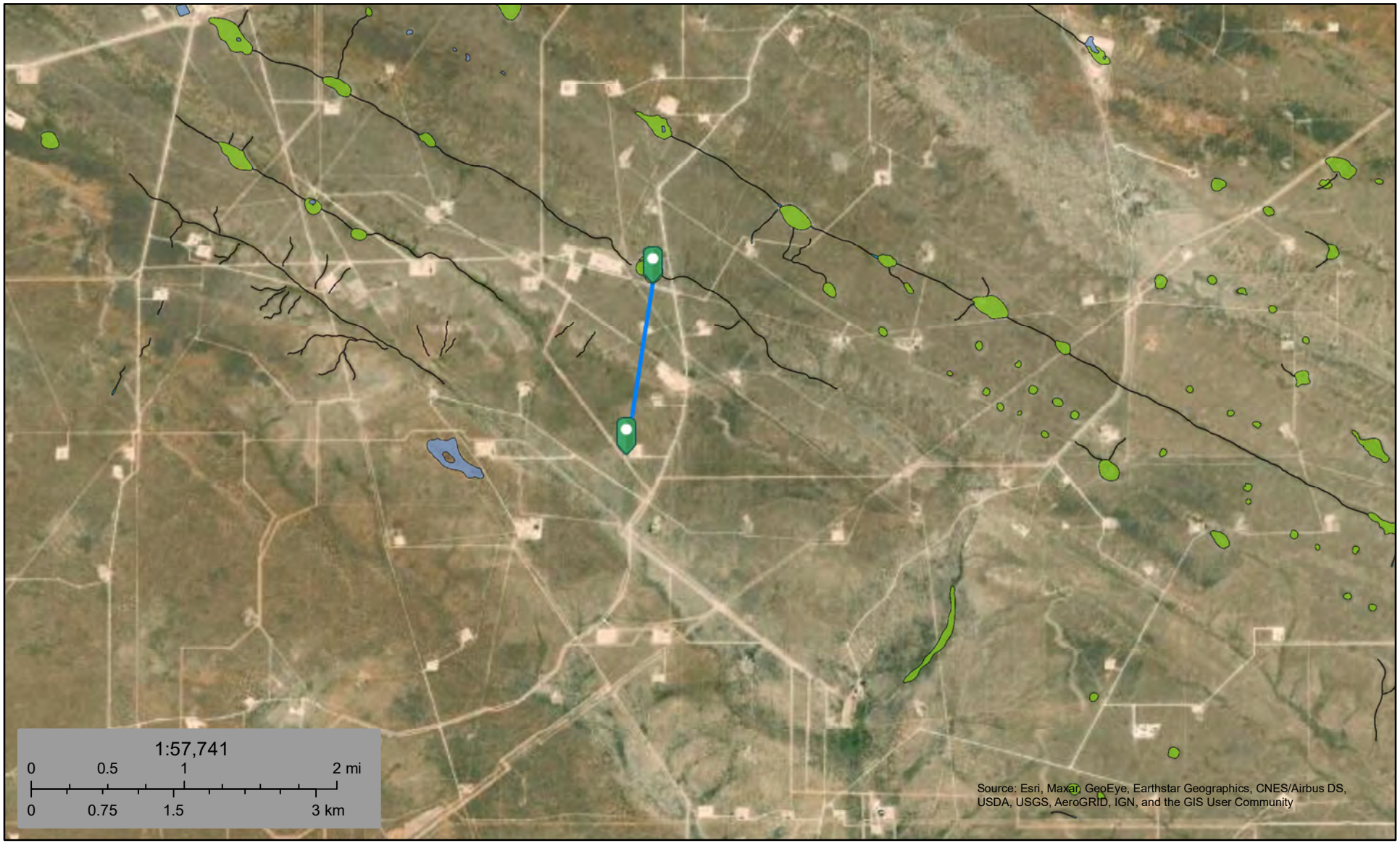
VERSATILITY. EXPERTISE.

Document Path: G:\1-Projects_US PROJECTS\3 Bear Energy LLC\20E-00504\002 - Grama Ridge East 34 State 2BS 006H\GIS\Fig X Karst Potential Grama Ridge 34 State 2BS 006H.mxd

U.S. Fish and Wildlife Service

National Wetlands Inventory

7 Grama Ridge East 34 State Wetland



September 11, 2020

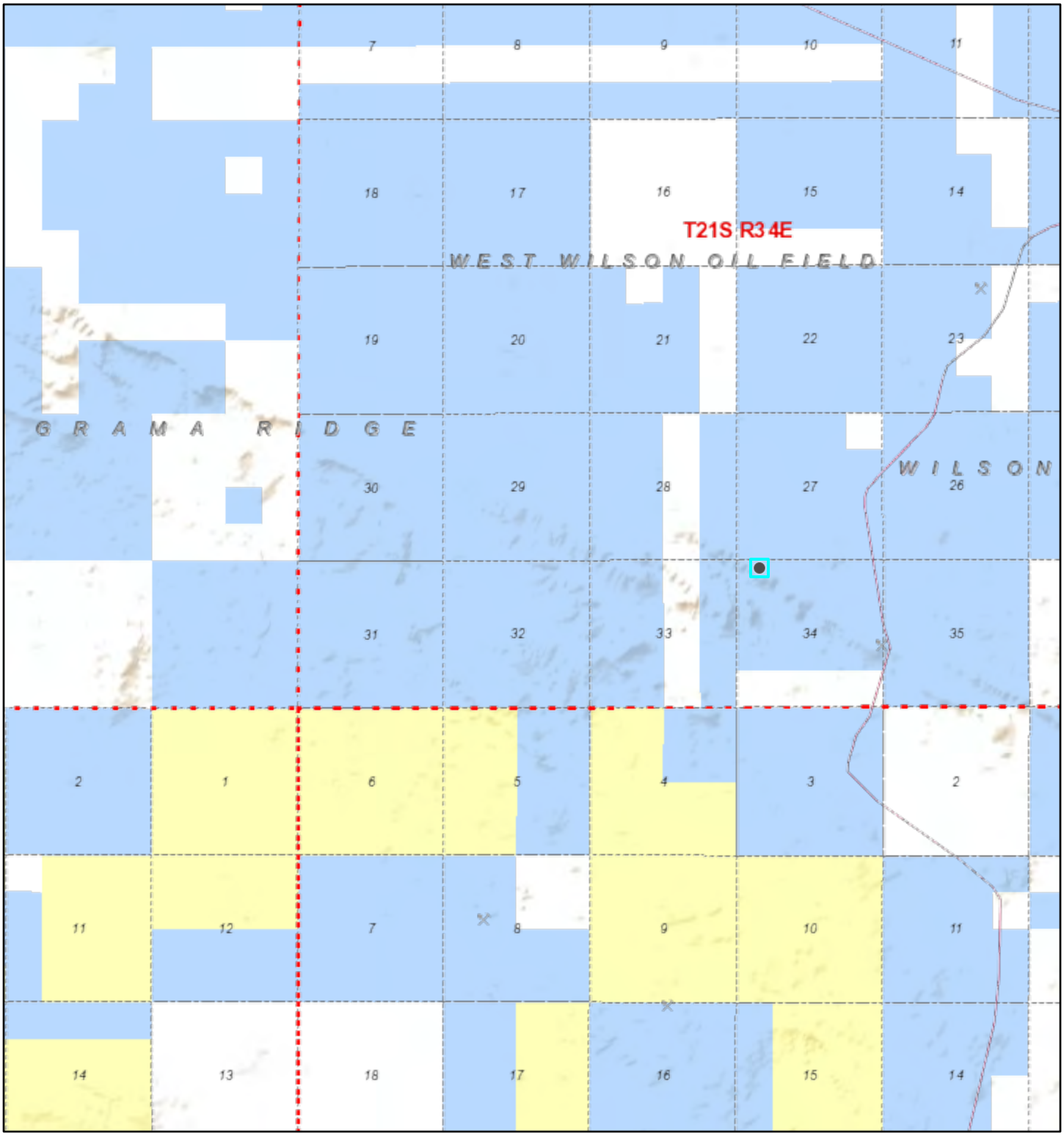
Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

Active Mines in New Mexico



5/15/2020, 12:06:44 PM

1:72,224

0 0.5 1 2 mi

0 0.75 1.5 3 km

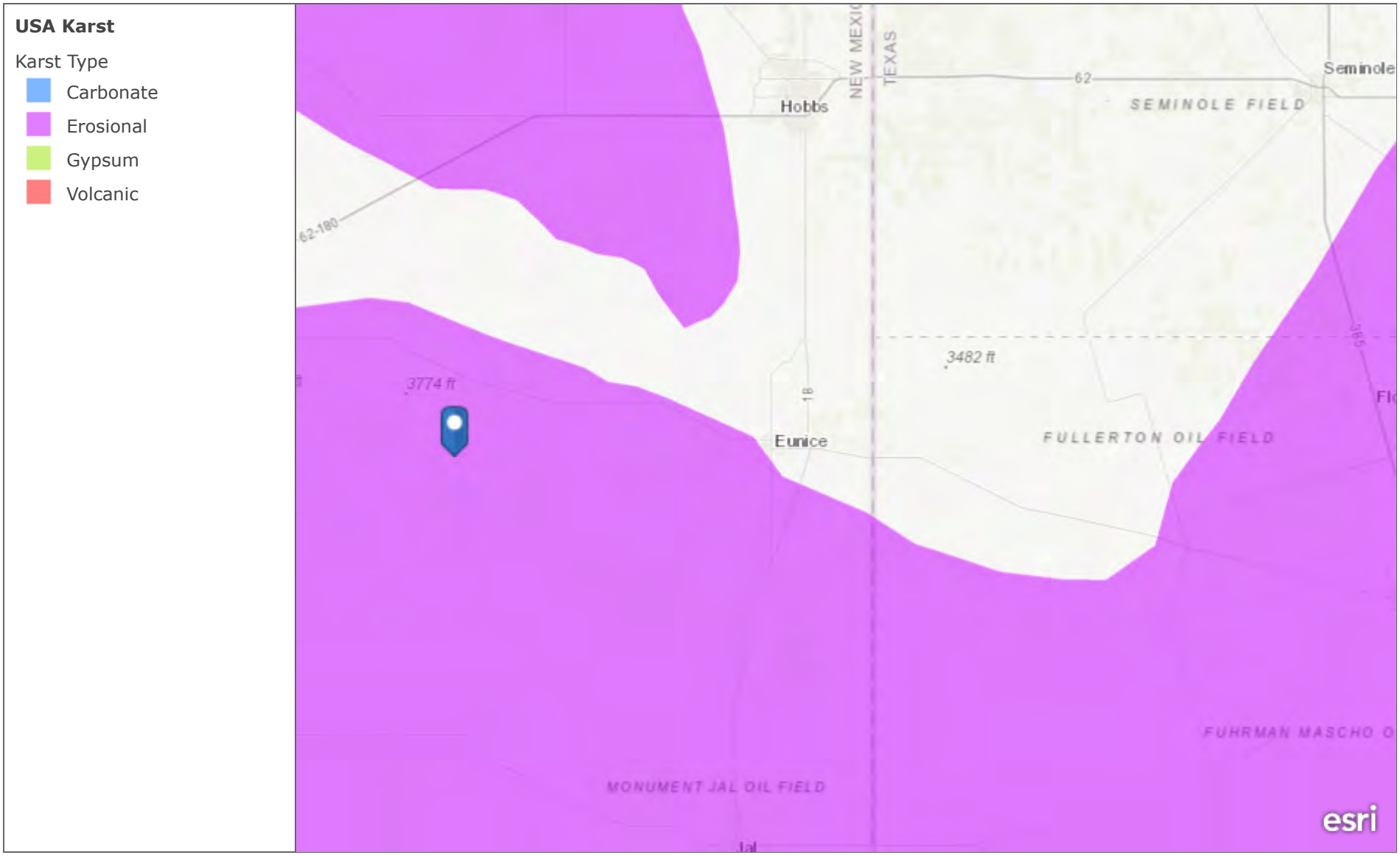
Registered Mines

Aggregate, Stone etc.

U.S. Bureau of Land Management - New Mexico State Office, Sources: Esri, USGS, NOAA, Sources: Esri, Garmin, USGS, NPS

EMNRD MMD GIS Coordinator

USA Karst



A map showing karst areas in the United States based on the U.S. Geological Survey Open-File Report 2004-1352

Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS | U.S. Geological Survey Open-File Report 2004-1352, Caves and Karst in the U.S. National Park Service, AGI Karst Map of the US.

NMBGMR, USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed May, 2020.

National Flood Hazard Layer FIRMette

FEMA

32°26'46.02"N

103°28'7.69"W

103°27'30.23"W

32°26'15.66"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/15/2020 at 2:12:59 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

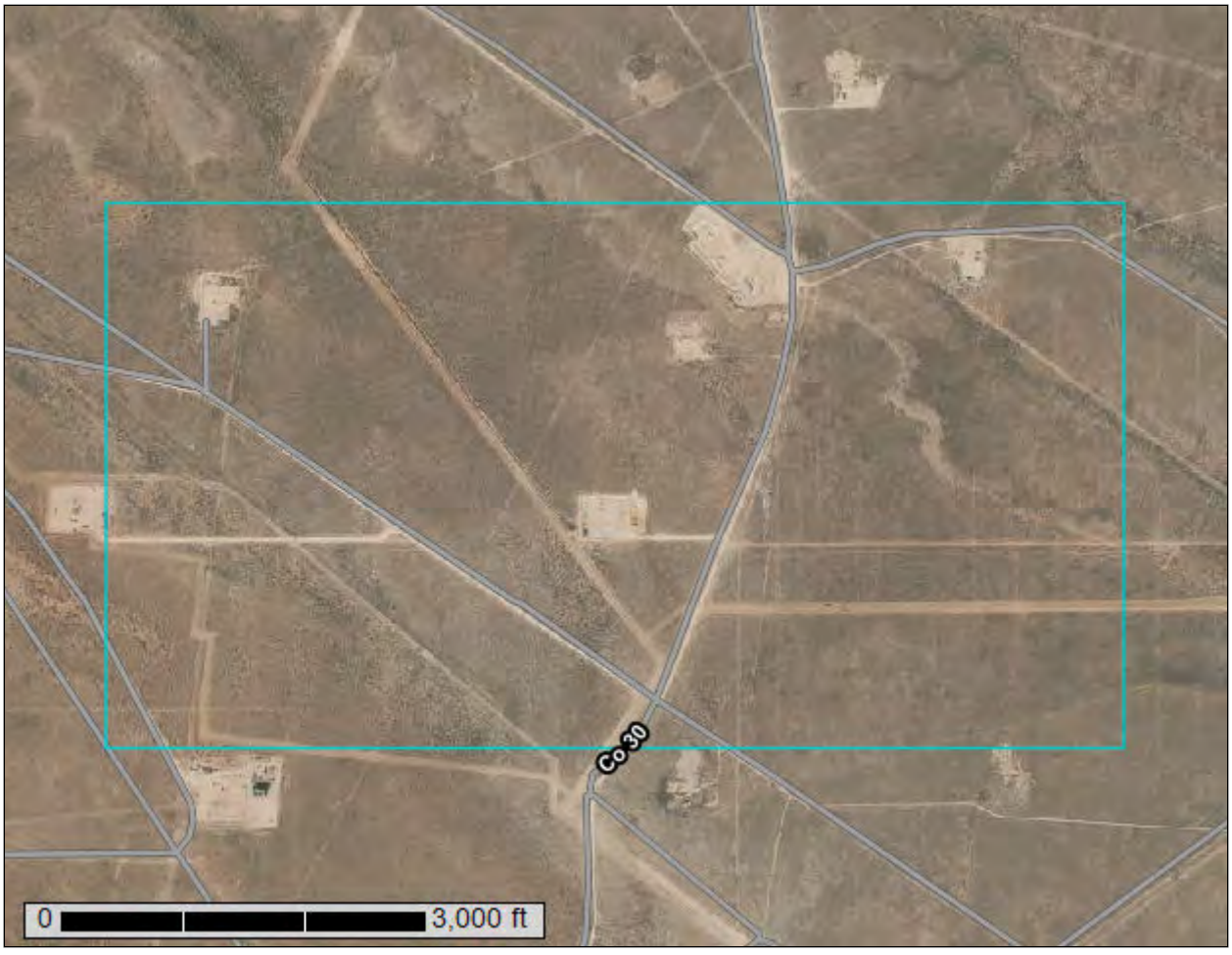
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Lea County, New Mexico



September 11, 2020

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

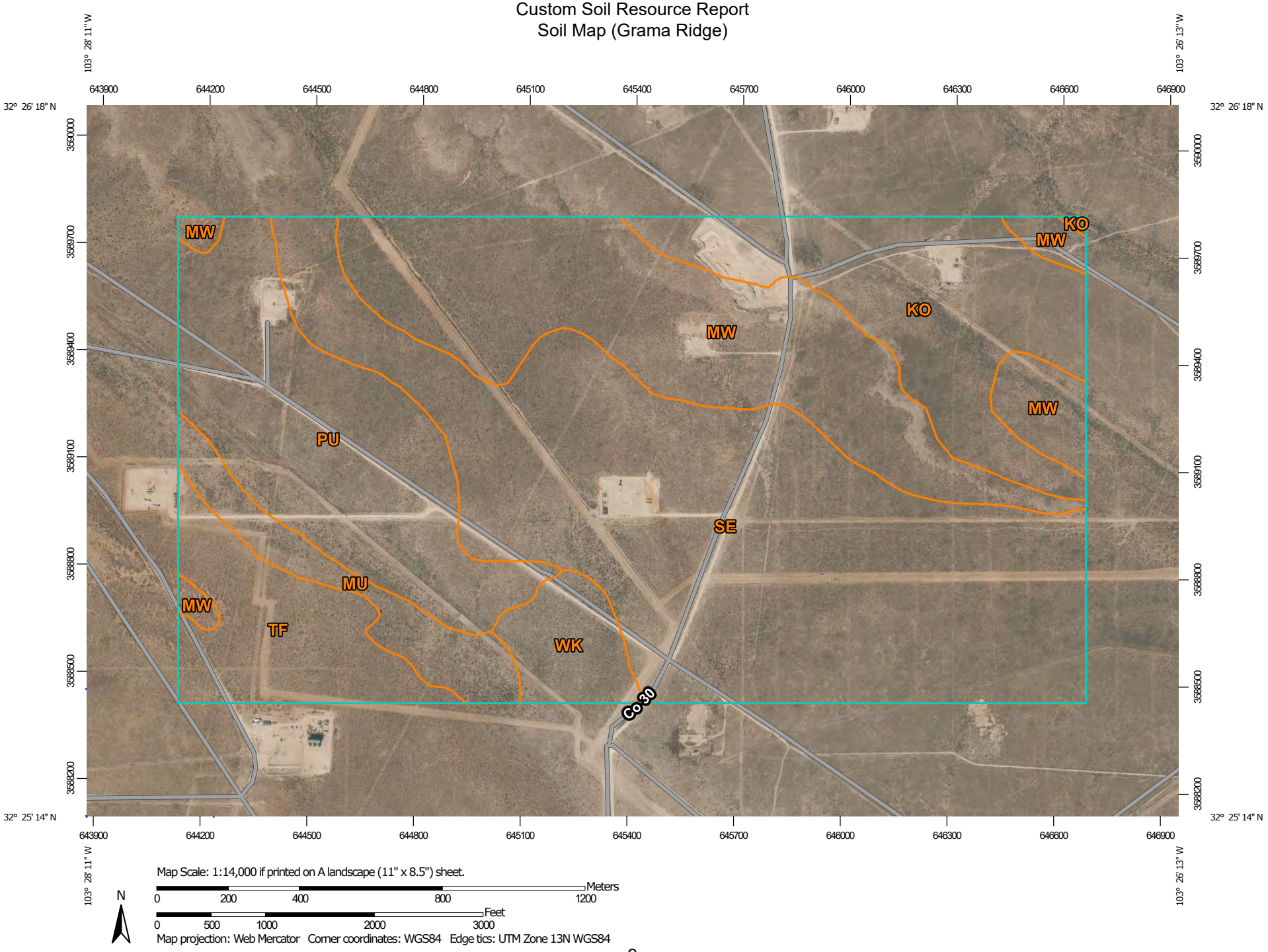
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map (Grama Ridge)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lea County, New Mexico
Survey Area Data: Version 17, Jun 8, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 7, 2020—May 12, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (Grama Ridge)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
KO	Kimbrough gravelly loam, dry, 0 to 3 percent slopes	105.7	12.3%
MU	Mixed alluvial land, frequently flooded	34.6	4.0%
MW	Mobeetie-Potter association, 1 to 15 percent slopes	184.0	21.3%
PU	Pyote and Maljamar fine sands	128.2	14.9%
SE	Simona fine sandy loam, 0 to 3 percent slopes	323.3	37.5%
TF	Tonuco loamy fine sand, 0 to 3 percent slopes	60.0	7.0%
WK	Wink loamy fine sand	26.3	3.1%
Totals for Area of Interest		**862.1**	**100.0%**

Map Unit Descriptions (Grama Ridge)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not

mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Lea County, New Mexico

KO—Kimbrough gravelly loam, dry, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2tw43
Elevation: 2,500 to 4,800 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 180 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition

Kimbrough, dry, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kimbrough, Dry

Setting

Landform: Plains, playa rims
Down-slope shape: Linear, convex
Across-slope shape: Linear, concave
Parent material: Loamy eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 3 inches: gravelly loam
Bw - 3 to 10 inches: loam
Bkkm1 - 10 to 16 inches: cemented material
Bkkm2 - 16 to 80 inches: cemented material

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 4 to 18 inches to petrocalcic
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 95 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water capacity: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R077DY049TX - Very Shallow 12-17" PZ
Hydric soil rating: No

Minor Components

Eunice

Percent of map unit: 10 percent
Landform: Plains
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R077DY049TX - Very Shallow 12-17" PZ
Hydric soil rating: No

Spraberry

Percent of map unit: 6 percent
Landform: Plains, playa rims
Down-slope shape: Linear, convex
Across-slope shape: Linear
Ecological site: R077DY049TX - Very Shallow 12-17" PZ
Hydric soil rating: No

Kenhill

Percent of map unit: 4 percent
Landform: Plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R077DY038TX - Clay Loam 12-17" PZ
Hydric soil rating: No

MU—Mixed alluvial land, frequently flooded

Map Unit Setting

National map unit symbol: dmqg
Elevation: 3,600 to 4,400 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 58 to 62 degrees F
Frost-free period: 190 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Ustifluvents and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ustifluvents

Setting

Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Mixed alluvium derived from sedimentary rock

Typical profile

C - 0 to 60 inches: stratified sand to loamy fine sand to loam to sandy clay loam to clay loam to clay

Properties and qualities

Slope: 0 to 7 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.06 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Available water capacity: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R042XC017NM - Bottomland
Hydric soil rating: Yes

Minor Components

Amarillo

Percent of map unit: 8 percent
Ecological site: R077CY056NM - Sandy Plains
Hydric soil rating: No

Portales

Percent of map unit: 7 percent
Ecological site: R077CY028TX - Limy Upland 16-21" PZ
Hydric soil rating: No

MW—Mobeetie-Potter association, 1 to 15 percent slopes

Map Unit Setting

National map unit symbol: dmqh
Elevation: 3,000 to 6,500 feet
Mean annual precipitation: 10 to 16 inches
Mean annual air temperature: 48 to 62 degrees F
Frost-free period: 110 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Mobeetie and similar soils: 70 percent

Potter and similar soils: 24 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mobeetie

Setting

Landform: Escarpments, draws
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous sandy alluvium derived from sedimentary rock

Typical profile

A - 0 to 4 inches: fine sandy loam
Bw - 4 to 24 inches: fine sandy loam
Bk - 24 to 60 inches: fine sandy loam

Properties and qualities

Slope: 1 to 10 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water capacity: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R077CY035TX - Sandy 16-21" PZ
Hydric soil rating: No

Description of Potter

Setting

Landform: Draws, escarpments
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous alluvium and/or calcareous eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 4 inches: gravelly fine sandy loam
BCk - 4 to 14 inches: extremely cobbly loam

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 70 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water capacity: Very low (about 0.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: R077CY037TX - Very Shallow 16-21" PZ
Hydric soil rating: No

Minor Components

Maljamar

Percent of map unit: 2 percent
Ecological site: R042XC003NM - Loamy Sand
Hydric soil rating: No

Mansker

Percent of map unit: 1 percent
Ecological site: R077CY028TX - Limy Upland 16-21" PZ
Hydric soil rating: No

Stony rock land

Percent of map unit: 1 percent
Ecological site: R042XC025NM - Shallow
Hydric soil rating: No

Ustifluvents

Percent of map unit: 1 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R042XC008NM - Draw
Hydric soil rating: Yes

Pyote

Percent of map unit: 1 percent
Ecological site: R042XC003NM - Loamy Sand
Hydric soil rating: No

PU—Pyote and Maljamar fine sands

Map Unit Setting

National map unit symbol: dmqq
Elevation: 3,000 to 3,900 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 60 to 62 degrees F
Frost-free period: 190 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Pyote and similar soils: 46 percent
Maljamar and similar soils: 44 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pyote

Setting

Landform: Plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 30 inches: fine sand
Bt - 30 to 60 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water capacity: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A

Ecological site: R042XC003NM - Loamy Sand
Hydric soil rating: No

Description of Maljamar

Setting

Landform: Plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 24 inches: fine sand
Bt - 24 to 50 inches: sandy clay loam
Bkm - 50 to 60 inches: cemented material

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 40 to 60 inches to petrocalcic
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water capacity: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: R042XC003NM - Loamy Sand
Hydric soil rating: No

Minor Components

Kermit

Percent of map unit: 10 percent
Ecological site: R042XC022NM - Sandhills
Hydric soil rating: No

SE—Simona fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: dmr2
Elevation: 3,000 to 4,200 feet
Mean annual precipitation: 10 to 15 inches
Mean annual air temperature: 58 to 62 degrees F
Frost-free period: 190 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Simona and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Simona

Setting

Landform: Plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 8 inches: fine sandy loam
Bk - 8 to 16 inches: gravelly fine sandy loam
Bkm - 16 to 26 inches: cemented material

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 7 to 20 inches to petrocalcic
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water capacity: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): 6s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D

Ecological site: R042XC002NM - Shallow Sandy
Hydric soil rating: No

Minor Components

Kimbrough
Percent of map unit: 8 percent
Ecological site: R077CY037TX - Very Shallow 16-21" PZ
Hydric soil rating: No

Lea
Percent of map unit: 7 percent
Ecological site: R077CY028TX - Limy Upland 16-21" PZ
Hydric soil rating: No

TF—Tonuco loamy fine sand, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 2tw3c
Elevation: 3,280 to 4,460 feet
Mean annual precipitation: 10 to 16 inches
Mean annual air temperature: 59 to 64 degrees F
Frost-free period: 180 to 220 days
Farmland classification: Not prime farmland

Map Unit Composition
Tonuco and similar soils: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tonuco

Setting
Landform: Plains, ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Rise
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Sandy eolian deposits

Typical profile
A - 0 to 12 inches: loamy fine sand
Bw - 12 to 17 inches: loamy sand
Bkkm - 17 to 39 inches: cemented material

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: 12 to 20 inches to petrocalcic
Drainage class: Excessively drained
Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water capacity: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R077DY048TX - Shallow 12-17" PZ
Hydric soil rating: No

Minor Components

Simona

Percent of map unit: 15 percent
Landform: Plains, ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Rise
Down-slope shape: Linear, convex
Across-slope shape: Linear
Ecological site: R042XC002NM - Shallow Sandy
Hydric soil rating: No

Berino

Percent of map unit: 10 percent
Landform: Plains, ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Rise
Down-slope shape: Linear, convex
Across-slope shape: Linear
Ecological site: R042XC003NM - Loamy Sand
Hydric soil rating: No

Cacique

Percent of map unit: 5 percent
Landform: Ridges, plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Rise
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: R042XC004NM - Sandy
Hydric soil rating: No

WK—Wink loamy fine sand

Map Unit Setting

National map unit symbol: dmrm
Elevation: 3,000 to 3,400 feet
Mean annual precipitation: 10 to 15 inches
Mean annual air temperature: 60 to 62 degrees F
Frost-free period: 190 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Wink and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wink

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Calcareous sandy alluvium and/or calcareous sandy eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 12 inches: loamy fine sand
Bk - 12 to 23 inches: sandy loam
BCk - 23 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 2.0
Available water capacity: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: A
Ecological site: R042XC003NM - Loamy Sand
Hydric soil rating: No

Minor Components

Berino
Percent of map unit: 5 percent
Ecological site: R042XC003NM - Loamy Sand
Hydric soil rating: No

Jal
Percent of map unit: 4 percent
Ecological site: R042XC030NM - Limy
Hydric soil rating: No

Midessa
Percent of map unit: 4 percent
Ecological site: R042XC007NM - Loamy
Hydric soil rating: No

Cacique
Percent of map unit: 2 percent
Ecological site: R042XC004NM - Sandy
Hydric soil rating: No

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USDA Natural Resources Conservation Service

Ecological site R042XC002NM
Shallow Sandy

Accessed: 09/11/2020

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Associated sites

R042XC004NM	**Sandy** Sandy sites often occur in association or in a complex with Shallow Sandy Sites.

Similar sites

R042XC004NM	**Sandy** Sandy ecological sites are similar to Shallow Sandy sites in species composition and Transition pathways.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occures on plains, alluvial fans, uplands, or fan piedmonts. The parent material consists of mixed loamy alluvium or eolian material derived from igneous and sedimentory bedrock. The petrocalcic layer is at a depth of 10 to 25 inches and undulating.

Slopes are nearly level to undulating, usually less than 9 percent. Elevations range from 2,842 to 4,500 feet.

Table 2. Representative physiographic features

Landforms	(1) Plain (2) Fan piedmont (3) Alluvial fan
Elevation	2,842–4,500 ft
Slope	1–9%
Aspect	Aspect is not a significant factor

Climatic features

The average annual precipitation ranges from 8 to 13 inches. Variations of 5 inches, more or less, are common. Over 80 percent of the precipitation falls from April through October. Most of the summer precipitation comes in the form of high intensity – short duration thunderstorms.
Temperatures are characterized by distinct seasonal changes and large annual and diurnal temperature changes. The average annual temperature is 61 degrees with extremes of 25 degrees below zero in the winter to 112 degrees in the summer.
The average frost-free season is from 207 to 220 days. The last killing frost is in late March or early April, and the first killing frost is in late October or early November.
Temperature and rainfall both favor warm season perennial plant growth. In years of abundant spring moisture, annual forbs and cool season grasses can make up an important component of the site. The vegetation of this site can take advantage of the moisture and the time it falls. Because of the soil profile, little moisture can be stored in the soil for any length of time. Moisture is readily available to the plants from the time it falls. Strong winds from the southwest blow from January through June which rapidly dries out the soil profile during a critical period for plant growth.

Climate data was obtained from http://www.wrcc.sage.dri.edu/summary/climsmnm.html web site using 50% probability for freeze-free and frost-free seasons using 28.5 degrees F and 32.5 degrees F respectively.

Table 3. Representative climatic features

Frost-free period (average)	221 days
Freeze-free period (average)	240 days
Precipitation total (average)	13 in

Influencing water features

This site is not influenced from water from wetlands or streams.

Soil features

Soils are very shallow to shallow, less than 20 inches in depth. Surface and subsurface textures are gravelly loamy sand, gravelly fine sandy loam or fine sandy loam.

An indurated calache layer occurs at depths of 6 to 25 inches and is at an average of 15 inches from the surface. Underlying material textures are very gravelly fine sandy loam, very gravelly sandy loam, gravelly fine sandy loam. Gravels are calcium carbonate concretions, calcium carbonate content ranges from 30 to 65 percent.

The indurated caliche layer typically holds water up in the profile for short periods within the root zone of plants. These soils will blow if left unprotected by vegetation.

Minimum and maximum values listed below represent the characteristic soils for this site.

Characteristic soils are:
Simona
Jerag

Table 4. Representative soil features

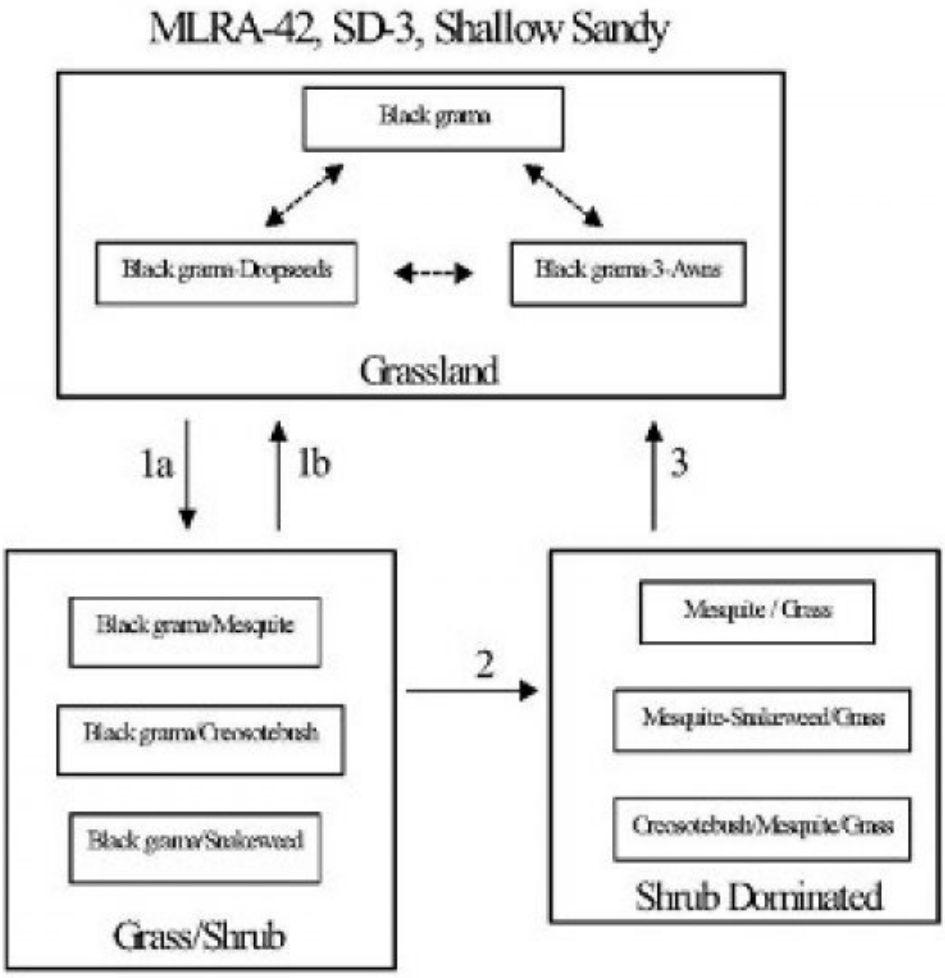
Surface texture	(1) Fine sandy loam (2) Loamy fine sand (3) Gravelly fine sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained to moderately well drained
Permeability class	Moderately slow to moderate
Soil depth	7–24 in
Surface fragment cover <=3"	5–25%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	1–2 in
Calcium carbonate equivalent (0-40in)	5–15%
Electrical conductivity (0-40in)	0–4 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	7.4–8
Subsurface fragment volume <=3" (Depth not specified)	5–25%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

Overview
The Shallow Sandy site occurs on upland plains, and tops of low ridges and mesas, associated with Sandy, Loamy Sand, and Shallow sites. Coarse to moderately coarse soil surface textures, shallow depth (<20 inches) to an indurated caliche layer (petrocalcic horizon), and an overwhelming dominance by black grama help to distinguish this site. The historic plant community of the Shallow Sandy site is a black grama dominated grassland sparsely dotted with shrubs. Shrubs, especially mesquite and creosotebush can increase or colonize due to the dispersal of shrub seeds by livestock or wildlife. This increase in mesquite and colonization of creosotebush may be enhanced by proximity to areas with existing high shrub densities. Fire suppression, and the loss of grass cover due to overgrazing or drought may facilitate the increase and encroachment of shrubs. Persistent loss of grass cover, competition for resources by shrubs, and periods of climate with increased winter precipitation and dry summers, may initiate the transition to a shrub-dominated state.

State and transition model

Plant Communities and Transitional Pathways (diagram)



1a. Seed dispersal, drought, overgrazing, fire suppression.
1b. Prescribed fire, brush control, prescribed grazing.

2. Persistent loss of grass cover, resource competition, increased winter precipitation.

3. Brush control, range seeding, prescribed grazing.

Figure 4.

State 1
Historic Climax Plant Community

Community 1.1
Historic Climax Plant Community

Grassland: This site responds well to management and is resistant to state change, due to the shallow depth to petrocalcic horizon and sandy surface textures. The sandy surface textures allow rapid water infiltration and the petrocalcic horizon helps to keep water perched and available to shallow rooted grasses. Black grama is the dominant species in the historic plant community, averaging 50 to 60 percent of the total production for this site. Bush muhly, blue grama, and dropseeds are present as sub-dominants. Typically, yucca, javalinabush, range

ATTACHMENT 4

ratany, prickly pear, and mesquite are sparsely dotted across the landscape. Leatherweed croton, cutleaf happlopappus, wooly groundsel, and threadleaf groundsel are common forbs. Continuous heavy grazing or extended periods of drought will cause a loss of grass cover characterized by a decrease in black grama, bush muhly, blue and sideoats grama, plains bristlegrass, and Arizona cottontop. Dropseeds and or threeawns may increase and become sub-dominant to black grama. Continued loss of grass cover in conjunction with dispersal of shrub seeds and fire suppression is believed to cause the transition to a state with increased amounts of shrubs (Grass/Shrub state).

Diagnosis: Black grama is the dominant grass species. Grass cover uniformly distributed. Shrubs are a minor component averaging only two to five percent canopy cover. Litter cover is high (40-50 percent of area), and litter movement is limited to smaller size class litter and short distances (<. 5m).

Other grasses that could appear on this site would include: six-weeks grama, fluffgrass, false-buffalograss, hairy grama, little bluestem, bristle panicum, cane bluestem, Indian ricegrass, tridens spp., and red lovegrass.

Other woody plants include: pricklypear, cholla, fourwing saltbush, catclaw mimosa, winterfat, American tarbush and mesquite.

Other forbs include: globemallow, verbena, desert holly, senna, plains blackfoot, trailing fleabane, fiddleneck, deerstongue, wooly Indianwheat, and locoweed.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	474	652	830
Forb	78	107	136
Shrub/Vine	48	66	84
Total	**600**	**825**	**1050**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	30-35%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	40-50%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	15-25%

Figure 6. Plant community growth curve (percent production by month). NM2802, R042XC002NM-Shallow Sandy-HCPC. SD-3 Shallow Sandy - Warm season plant community.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	5	10	10	25	30	12	5	0	0

State 2

Grass/Shrub

Community 2.1
Grass/Shrub

Grass/Shrub: This state is characterized by the notable presence of shrubs, especially mesquite, broom snakeweed, and/or creosotebush, however grasses remain as the dominant species. Black grama is the dominant grass species. Threeawns and or dropseeds are sub-dominant. The susceptibility of the Shallow Sandy site to shrub encroachment may be higher when located adjacent to other sites with high densities of mesquite or creosotebush. Retrogression within this site is characterized by decreases in grass cover and increasing densities of shrubs.

Diagnosis: Black grama remains as the dominant grass species. Grass cover varies in response to the amount of shrub increase, ranging from uniform to patchy. Shrubs are found at increased densities relative to the grassland state, especially mesquite, creosotebush, or broom snakeweed.

Transition to Grass/Shrub (1a) Historically fire may have kept mesquite and other shrubs in check by completely killing some species and disrupting seed production cycles and suppressing the establishment of shrub seedlings in others. Fire suppression combined with seed dispersal by livestock and wildlife is believed to be the factors responsible for the establishment and increase in shrubs.1, 3 Loss of grass cover due to overgrazing, prolonged periods of drought, or their combination, reduces fire fuel loads and increases the susceptibility of the site to shrub establishment.

Key indicators of approach to transition:
Increase in the relative abundance of dropseeds and threeawns
Presence of shrub seedlings
Loss of organic matter—evidenced by an increase in physical soil crusts 8

Transition back to Grassland (1b) Brush control is necessary to initiate the transition back to the grassland state. If adequate fuel loads remain, possibly the reintroduction of fire as a management tool will assist in the transition back, however, mixed results have been observed concerning the effects of fire on black grama grasslands.6 Prescribed grazing will help ensure adequate rest following brush control and will assist in the establishment and maintenance of grass cover capable of sustaining fire.

State 3
Shrub Dominated

Community 3.1
Shrub Dominated

Shrub-Dominated: Across the range of soil types included in the Shallow Sandy site, mesquite is typically the dominant shrub, but it does occur as a co-dominant or sub-dominant species with creosotebush or broom snakeweed. Mesquite tends to dominate when the Shallow Sandy site occurs as part of a complex or in association with Sandy or Loamy Sand sites. Creosotebush tends to dominate on Shallow Sandy sites that occur as part of, or adjacent to Shallow Sites. Broom snakeweed increases in response to heavy grazing, but tends to cycle in and out depending on timing of rainfall. However, once the site is dominated by shrubs and snakeweed becomes well established, it tends to remain as a major component in the shrub dominated state.

Diagnosis: Mesquite, creosotebush, or snakeweed cover is high, exceeding that of grasses. Grass cover is patchy with large connected bare areas present. Black grama, threeawns, or dropseeds may be the dominant grass. Evidence of accelerated wind erosion in the form of pedestalling of plants, and soil deposition around shrub bases may be common.

Transition to Shrub-Dominated (2) Persistent loss of grass cover and the resulting increased competition between shrubs and remaining grasses for dwindling resources (especially soil moisture) may drive this transition.5 Additionally periods of increased winter precipitation may facilitate periodic episodes of shrub expansion and establishment. 4

Key indicators of approach to transition:
Increase in size and frequency of bare patches.
Loss of grass cover in shrub interspaces.
Increased signs of erosion, evidenced by pedestalling of plants, and soil and litter deposition on leeward side of plants. 7

Transition back to Grassland (3) Brush control is necessary to reduce competition from shrubs and reestablish grasses. Range seeding may be necessary if insufficient grasses remain, The benefits, and costs, will vary depending upon the degree of site degradation, and adequate precipitation following seeding.

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Warm Season**			413–495	
	black grama	BOER4	*Bouteloua eriopoda*	413–495	–
2	**Warm Season**			41–83	
	bush muhly	MUPO2	*Muhlenbergia porteri*	41–83	–
3	**Warm Season**			41–83	
	blue grama	BOGR2	*Bouteloua gracilis*	41–83	–
4	**Warm Season**			25–41	
	sideoats grama	BOCU	*Bouteloua curtipendula*	25–41	–
5	**Warm Season**			41–83	
	spike dropseed	SPCO4	*Sporobolus contractus*	41–83	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	41–83	–
	mesa dropseed	SPFL2	*Sporobolus flexuosus*	41–83	–
6	**Warm Season**			17–41	
	threeawn	ARIST	*Aristida*	17–41	–
7	**Warm Season**			41–83	
	Arizona cottontop	DICA8	*Digitaria californica*	41–83	–
	plains bristlegrass	SEVU2	*Setaria vulpiseta*	41–83	–
8	**Warm Season**			41–83	
	mat sandbur	CELO3	*Cenchrus longispinus*	41–83	–
	hooded windmill grass	CHCU2	*Chloris cucullata*	41–83	–
9	**Other Perennial Grasses**			25–41	
	Grass, perennial	2GP	*Grass, perennial*	25–41	–
Shrub/Vine					
10	**Shrub**			8–25	
	javelina bush	COER5	*Condalia ericoides*	8–25	–
11	**Shrub**			8–25	
	yucca	YUCCA	*Yucca*	8–25	–
12	**Shrub**			8–25	
	jointfir	EPHED	*Ephedra*	8–25	–
	littleleaf ratany	KRER	*Krameria erecta*	8–25	–
13	**Shrub**			8–25	

	featherplume	DAFO	*Dalea formosa*	8–25	–
14	**Shrub**			8–25	
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	8–25	–
15	**Other Shrubs**			25–41	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	25–41	–
Forb					
16	**Forb**			17–41	
	leatherweed	CRPOP	*Croton pottsii var. pottsii*	17–41	–
	Goodding's tansyaster	MAPIG2	*Machaeranthera pinnatifida ssp. gooddingii var. gooddingii*	17–41	–
17	**Forb**			17–41	
	woolly groundsel	PACA15	*Packera cana*	17–41	–
	threadleaf ragwort	SEFLF	*Senecio flaccidus var. flaccidus*	17–41	–
18	**Forb**			8–25	
	whitest evening primrose	OEAL	*Oenothera albicaulis*	8–25	–
19	**Other Forbs**			8–25	
	Forb (herbaceous, not grass nor grass-like)	2FORB	*Forb (herbaceous, not grass nor grass-like)*	8–25	–

Animal community

This site provides habitats which support a resident animal community that is characterized by pronghorn antelope, swift fox, black-tailed jackrabbit, spotted ground squirrel, Ord’s kangaroo rat, northern grasshopper mouse, coyote, horned lark, meadowlark, lark bunting, scaled quail, morning dove, side-blotched lizard, round-tailed horned lizard, marbled whiptail, prairie rattlesnake and ornate box turtle.

Hydrological functions

The runoff curve numbers are determined by field investigations using hydraulic cover conditions and hydrologic soil groups.

Hydrologic Interpretations
Soil Series Hydrologic Group
Jarag D
Simona D

Recreational uses

This site offers recreation for hiking, horseback riding, nature observation and photography, and quail and dove hunting. During years of abundant spring moisture, this site displays a riot of color from wildflowers during May and June. A few summer and fall flowers also occur.

Wood products

The natural potential plant community of this site affords little or no wood products. Where the site has been invaded by mesquite or cholla cactus the roots and stems of these plants provide attractive material for a variety of curiosities, such as lamps and small furniture.

Other products

This site is suitable for grazing by all kinds and classes of livestock during all seasons of the year. Because of the sandy textures and shallow profile, this site will respond rapidly to management. As this site deteriorates, plants such as black grama, bush muhly, blue and sideoats grama, plains bristlegrass and Arizona cottontop, will decrease and be replaced by plants such as threeawns, mesquite, creosote bush, and broom snakeweed. This also causes a decrease in ground cover, leaving the soil to blow. This site responds best to a system of management that rotates the season of use.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month
Similarity Index Ac/AUM
100 - 76 2.5 – 3.5
75 – 51 3.2 – 4.6
50 – 26 4.5 – 7.5
25 – 0 7.6 +

Inventory data references

Data collection for this site was done in conjunction with the progressive soil surveys within the Southern Desertic Basins, Plains and Mountains, Major Land Resource Areas of New Mexico. This site has been mapped and correlated with soils in the following soil surveys. Eddy County, Lea County, and Chaves County.

Other references

Literature References:

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2. Hennessy, J.T., R.P. Gibbens, J.M. Tromble, and M. Cardenas. 1983. Water properties of caliche. J. Range Manage. 36: 723-726.

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4. Moir, W.H., and J. A. Ludwig. 1991. Plant succession and changing land features in desert grasslands. P. 15-18. In P.F. Ffolliott and W.T. Swank (eds.) People and the temperate region: a summary of research from the United States Man and the Biosphere Program 1991. U.S. Dept. State, Publ No. 9839, Nat. Tech. Info. Serv., U.S. Dept. Commerce, Springfield, Illinois. 63 p.

5. Tiedemann, A. R. and J. O. Klemmedson. 1977. Effect of mesquite trees on vegetation and soils in the desert grassland. J. Range Manage. 30: 361-367.

6. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (2002, September). Fire Effects Information System, [Online]. Available: http://www.fs.fed.us/database/feis/ [accessed 2/10/03].

7. U.S. Department of Agriculture, Natural Resources Conservation Service. 2001. Soil Quality Information Sheets. Rangeland Soil Quality—Wind Erosion. Rangeland Sheet 10 [Online]. Available: http://www.statlab.iastate.edu/survey/SQI/range.html

8. U.S. Department of Agriculture, Natural Resources Conservation Service. 2001. Soil Quality Information Sheets. Rangeland Soil Quality—Physical and Biological Soil Crusts. Rangeland Sheet 7 [Online]. Available: http://www.statlab.iastate.edu/survey/SQI/range.html

Contributors

David Trujillo
Don Sylvester

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

---

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

---

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

---

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

---

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

---

14. **Average percent litter cover (%) and depth (in):**

---

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

---

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

---

17. **Perennial plant reproductive capability:**

ATTACHMENT 5

Daily Site Visit Report

Client:	3 Bear Energy LLC	Inspection Date:	4/15/2020
Site Location Name:	Grama Ridge East 34 State 2BS 006H	Report Run Date:	4/16/2020 12:29 AM
Project Owner:	Liz Klein	File (Project) #:	20E-00504
Project Manager:	Natalie Gordon	API #:	30-025-43821
Client Contact Name:	Liz Klein	Reference	Battery Site release
Client Contact Phone #:	(303) 882-4404		

Summary of Times

Left Office	4/15/2020 7:00 AM
Arrived at Site	4/15/2020 8:30 AM
Departed Site	4/15/2020 4:56 PM
Returned to Office	4/15/2020 6:01 PM

Summary of Daily Operations

8:49 Complete delineation of spill area on pad vertically and horizontally. Placement of remediatact on pasture area effected

8:50 Spill on pad area is in a very congested area containing multiple flow lines, electrical lines and panels, skids, and equipment.

9:00 Spill travelled in three different directions once leaving pad and effecting pasture area, did not travel significantly far on the north west part of spill but travelled further southwest into a more vegetative area

9:07 For on pad area to be remediated will be nearly impossible to get equipment into tight spaces, if further remediation efforts are taken, it is likely that hand excavation will need to occur and possible deferral of areas next to equipment to retain the integrity of the equipment

16:28 Tried to guide which samples to run with petroflag on how strong the odor was within the sample. Ran all ss samples due to horizontal delineation and to verify if a step out was needed or not

Next Steps & Recommendations

1

Daily Site Visit Report

Daily Site Visit Report

Site Photos

Viewing Direction: South

Spill area underneath congested area of equipment

Viewing Direction: West

Area of spill where it travelled off pad and into pasture

Viewing Direction: West

Spill area between congested area within equipment

Viewing Direction: West

Spill area in between equipment on north side of containment

Daily Site Visit Report

Viewing Direction: Northwest	**Viewing Direction**: North
	
Spill area within congested area of production equipment	Spill area underneath above ground flow lines and equipment
Viewing Direction: Southeast	**Viewing Direction**: North
	
Spill area underneath flow lines and equipment	Area of where spill travelled towards the off pad area next to above ground flow lines

Daily Site Visit Report

Viewing Direction: East

Area on west side of pad where spill flowed off pad

Viewing Direction: Southeast

Area where part of spill travelled north west off pad

Viewing Direction: Southwest

Spill area off pad

Viewing Direction: West

Spill area in pasture where vegetation was effected

Daily Site Visit Report

Viewing Direction: West	**Viewing Direction**: East
	
Vegetative area effected from spill where remediact will be placed	Spill area on west side of pad in pasture

Viewing Direction: South	**Viewing Direction**: South
	
West side of pad where spill travelled into pasture	Spill area on western end of pad next to above ground flow lines

Daily Site Visit Report

Viewing Direction: East	**Viewing Direction**: West
	
Spill area under equipment where possible point of release is	Placement of remediact between equipment due to too close to equipment

Viewing Direction: North	**Viewing Direction**: West
	
Spot where remediact will be placed due to electrical lines buried	Area where spill occurred

Daily Site Visit Report

Daily Site Visit Signature

Inspector: Monica Peppin

Signature:

Signature

Daily Site Visit Report

Client:	3 Bear Energy LLC	Inspection Date:	5/21/2020
Site Location Name:	Grama Ridge East 34 State 2BS 006H	Report Run Date:	5/22/2020 2:43 AM
Project Owner:	Liz Klein	File (Project) #:	20E-00504
Project Manager:	Natalie Gordon	API #:	30-025-43821
Client Contact Name:	Liz Klein	Reference	Battery Site release
Client Contact Phone #:	(303) 882-4404		

Summary of Times

Left Office	5/21/2020 6:20 AM
Arrived at Site	5/21/2020 7:30 AM
Departed Site	
Returned to Office	

Summary of Daily Operations

9:56 Begin hand excavation on pad area and collect confirmation samples

9:56 Site still has heavy staining and soil has oil odor to it. No equipment being used to remove contamination. Taking out around 3-4 inches around equipment to remove staining and collect samples

11:36 For pad area there are 5 base samples and 3 side wall samples. The side wall samples are for where hand excavation occurred and there and depth is greater than 0.25 inches. Side wall one is to stand for the depth of 0-1.5’ where bs11 was collected near point of release

18:18 Had backhoe come to clean side of pad wall where contamination flowed through a degraded spot leading into pasture. Considering that area part of pasture due to being so close to the pasture itself

Next Steps & Recommendations

1

Daily Site Visit Report

Site Photos

Viewing Direction: West

Fenced pasture area

Viewing Direction: South

Hand dug area next to piping on west side of pad

Viewing Direction: South

Area around point of release at depth of 1.5’

Viewing Direction: East

Scraped area in between equipment

Daily Site Visit Report

Viewing Direction: East	**Viewing Direction**: North
	
Hand excavated area between lact units at 1 ft	Hand excavated area on west side of lact unit
Viewing Direction: West	**Viewing Direction**: West
	
Hand excavated area between compressor and lact	Excavation area on north side of pad

Daily Site Visit Report

Daily Site Visit Signature

Inspector: Monica Peppin

Signature:

Daily Site Visit Report

Client:	3 Bear Energy LLC	Inspection Date:	6/8/2020
Site Location Name:	Grama Ridge East 34 State 2BS 006H	Report Run Date:	6/8/2020 7:08 PM
Project Owner:	Liz Klein	File (Project) #:	20E-00504
Project Manager:	Natalie Gordon	API #:	30-025-43821
Client Contact Name:	Liz Klein	Reference	Battery Site release
Client Contact Phone #:	(303) 882-4404		

Summary of Times

Left Office	6/8/2020 6:33 AM
Arrived at Site	6/8/2020 8:00 AM
Departed Site	6/8/2020 11:34 AM
Returned to Office	

Summary of Daily Operations

10:33 Apply microblaze to pasture area and till dirt to get a good mixture into soil. Backfill around equipment on pad

11:00 All pasture area has a layer of microblaze applied and soil is being turned and a layer of water will be applied on top of turned soil. Pad area to be completely backfilled

Next Steps & Recommendations

1. Give microblaze time to take effect
2. Resample pasture area for confirmation

Daily Site Visit Report

Site Photos

Viewing Direction: West

Pasture area where soil tilled and microblaze applied

Viewing Direction: North

Pasture area

Viewing Direction: Northwest

Pasture area

Viewing Direction: West

Pasture area

Daily Site Visit Report

Daily Site Visit Signature

Inspector: Monica Peppin

Signature:

Daily Site Visit Report

Client:	3 Bear Energy LLC	Inspection Date:	7/15/2020
Site Location Name:	Grama Ridge East 34 State Com	Report Run Date:	7/15/2020 8:00 PM
Client Contact Name:	Liz Klein	API #:	30-025-46537
Client Contact Phone #:	(303) 882-4404		
Unique Project ID		Project Owner:	
Project Reference #		Project Manager:	

Summary of Times

Arrived at Site	7/15/2020 7:15 AM
Departed Site	7/15/2020 12:09 PM

Field Notes

11:57 On site to collect confirmation samples in pasture area

11:59 Area still has visible staining. Can still see where soil was turned when microblaze was applied. Soil still has an oil odor and some places have seemed to have become bleached. Area towards BS1-3 seem to have been low points at the end of the spill where oil must have puddled up.

12:00 Numbers on field screens are not applicable to collect and send to lab for closure criteria in the pasture area. Three samples were able to be collected for lab analysis BS4,6,8

12:01 Weather has had extreme heat conditions the past few weeks. Unsure if these extreme conditions could have an effect on the process of microblaze

Next Steps & Recommendations

1. Possible additional water added to area with more microblaze
2. Wait a couple weeks longer to sample recollection
3. Discuss with landowner and client what process they would like to take
4. Turn soil again with additional application

Daily Site Visit Report

Daily Site Visit Report

Site Photos

Viewing Direction: North

Pasture area where spill occurred

Viewing Direction: North

Pasture area

Viewing Direction: North

Pasture area

Daily Site Visit Report

Viewing Direction: West

Pasture area

Viewing Direction: West

Pasture area

Viewing Direction: West

Pasture area

Viewing Direction: East

Pasture area

Daily Site Visit Report

Viewing Direction: South	**Viewing Direction**: South
	
Pasture area	Pasture area

Daily Site Visit Report

Daily Site Visit Signature

Inspector: Monica Peppin

Signature:

Daily Site Visit Report

Client:	3 Bear Energy LLC	Inspection Date:	8/20/2020
Site Location Name:	Grama Ridge East 34 State Com	Report Run Date:	8/21/2020 3:49 AM
Client Contact Name:	Liz Klein	API #:	30-025-46537
Client Contact Phone #:	(303) 882-4404		
Unique Project ID	-Grama Ridge East 34 State Com	Project Owner:	Liz Klein
Project Reference #	NRM2012856003	Project Manager:	Natalie Gordon

Summary of Times

Arrived at Site	8/20/2020 9:24 AM
Departed Site	8/20/2020 11:49 AM

Field Notes

21:45 Recollecting confirmatory samples BS20-11 and BS20-012.

Next Steps & Recommendations

1 Submit confirmation samples for lab analysis.

2 Complete closure report.

Daily Site Visit Report

Site Photos

Viewing Direction: West

Sample Area

Viewing Direction: West

Sample Area

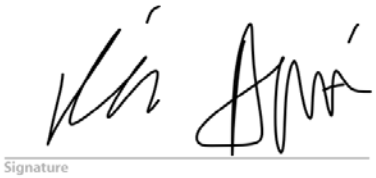
Viewing Direction: Northwest

Sample Area

Daily Site Visit Report

Daily Site Visit Signature

Inspector: Kevin Smith

Signature: 
Signature

ATTACHMENT 6

Natalie Gordon

From: Dhugal Hanton <vertexresourcegroupusa@gmail.com>
Sent: Tuesday, May 19, 2020 1:00 PM
To: Natalie Gordon
Subject: Fwd: NRM2012856003: Grama Ridge East 34 State - 48-hr Notification of Confirmation Sampling

---------- Forwarded message ---------
From: **Dhugal Hanton** <vertexresourcegroupusa@gmail.com>
Date: Tue, May 19, 2020 at 12:59 PM
Subject: NRM2012856003: Grama Ridge East 34 State - 48-hr Notification of Confirmation Sampling
To: EMNRD-OCD-District1spills <emnrd-ocd-district1spills@state.nm.us>, Bratcher, Mike, EMNRD <Mike.Bratcher@state.nm.us>, <lklein@3bearllc.com>, <bblevins5252@gmail.com>, Bo Buescher <bbuescher@3bearllc.com>

All,

Please accept this email as 48-hr notification that Vertex Resource Services has scheduled remediation fieldwork and confirmatory sampling to be conducted at Grama Ridge East 34 State for the release that occurred on March 5, 2020, incident tracking #: NRM2012856003.

This work will be completed on behalf of 3 Bear Delaware Operating - NM, LLC.

On Thursday, May 21, 2020 at approximately 9:00 a.m., Monica Peppin of Vertex will be onsite to guide remediation efforts. Following completion of the remediation fieldwork, she will conduct confirmatory sampling. Confirmatory sampling is expected to begin at approximately 1:00pm. Monica can be reached at 575-361-9880. If you need directions to the site, please do not hesitate to contact her. If you have any questions or concerns regarding this notification or the attached sample plan, please give me a call at 505-506-0040.

Thank you,
Natalie

Natalie Gordon
Project Manager

Vertex Resource Group Ltd.
213 S. Mesa Street
Carlsbad, NM 88220

P 575.725.5001 ext 709
C 505.506.0040
F

www.vertex.ca

Natalie Gordon

From: Dhugal Hanton <vertexresourcegroupusa@gmail.com>
Sent: Monday, July 13, 2020 1:45 PM
To: Natalie Gordon
Subject: Fwd: NRM2012856003: Grama Ridge East 34 State - 48-hr Notification of Confirmatory Sampling

---------- Forwarded message ---------
From: **Dhugal Hanton** <vertexresourcegroupusa@gmail.com>
Date: Mon, Jul 13, 2020 at 1:44 PM
Subject: NRM2012856003: Grama Ridge East 34 State - 48-hr Notification of Confirmatory Sampling
To: Bratcher, Mike, EMNRD <Mike.Bratcher@state.nm.us>, EMNRD-OCD-District1spills <emnrd-ocd-district1spills@state.nm.us>, <lklein@3bearllc.com>, Bo Buescher <bbuescher@3bearllc.com>, <bblevins5252@gmail.com>

All,

Please accept this email as 48-hr notification that Vertex Resource Services has scheduled remediation fieldwork and confirmatory sampling to be conducted at Grama Ridge East 34 State for the release that occurred on March 5, 2020, incident tracking #: NRM2012856003.

This work will be completed on behalf of 3 Bear Delaware Operating - NM, LLC.

On Wednesday, July 15, 2020 at approximately 1:00 p.m., Monica Peppin of Vertex will be onsite to conduct confirmatory sampling for the portion of the release area treated in-situ. Monica can be reached at 575-361-9880. If you need directions to the site, please do not hesitate to contact her. If you have any questions or concerns regarding this notification or the attached sample plan, please give me a call at 505-506-0040.

Thank you,
Natalie

Natalie Gordon
Project Manager

Vertex Resource Group Ltd.
213 S. Mesa Street
Carlsbad, NM 88220

P 575.725.5001 ext 709
C 505.506.0040
F

www.vertex.ca

Natalie Gordon

From: Dhugal Hanton <vertexresourcegroupusa@gmail.com>
Sent: Wednesday, August 5, 2020 10:34 AM
To: Natalie Gordon
Subject: Fwd: NRM2012856003: Grama Ridge East 34 State - 48-hr Notice of Confirmatory Samplin

---------- Forwarded message ---------
From: **Dhugal Hanton** <vertexresourcegroupusa@gmail.com>
Date: Wed, Aug 5, 2020 at 10:28 AM
Subject: NRM2012856003: Grama Ridge East 34 State - 48-hr Notice of Confirmatory Samplin
To: <OCD.Enviro@state.nm.us>, <lklein@3bearllc.com>, Bo Buescher <bbuescher@3bearllc.com>, <bblevins5252@gmail.com>, <rmann@slo.state.nm.us>

All,

Please accept this email as 48-hr notification that Vertex Resource Services has scheduled additional confirmatory sampling to be conducted at Grama Ridge East 34 State for the release that occurred on March 5, 2020, incident tracking #: NRM2012856003.

This work will be completed on behalf of 3 Bear Delaware Operating - NM, LLC.

On Thursday, August 6, 2020 at approximately 3:00 p.m., Monica Peppin of Vertex will be onsite to conduct confirmatory sampling for the portion of the release area treated in-situ. Monica can be reached at 575-361-9880. If you need directions to the site, please do not hesitate to contact her. If you have any questions or concerns regarding this notification or the attached sample plan, please give me a call at 505-506-0040.

Thank you,
Natalie

Natalie Gordon
Project Manager

Vertex Resource Group Ltd.
213 S. Mesa Street
Carlsbad, NM 88220

P 575.725.5001 ext 709
C 505.506.0040
F

www.vertex.ca

ATTACHMENT 7

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

April 24, 2020

Natalie Gordon

Vertex Resource Group Ltd.
213 S. Mesa St
Carlsbad, NM 88220
TEL: (505) 506-0040
FAX:

RE: Grama Ridge East 34 State 2BS 006H OrderNo.: 2004817

Dear Natalie Gordon:

Hall Environmental Analysis Laboratory received 7 sample(s) on 4/17/2020 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **2004817**
Date Reported: **4/24/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BH20-02 0'
Project: Grama Ridge East 34 State 2BS 006H **Collection Date:** 4/15/2020 9:25:00 AM
Lab ID: 2004817-001 **Matrix:** SOIL **Received Date:** 4/17/2020 8:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	25000	990		mg/Kg	100	4/21/2020 8:09:30 PM
Motor Oil Range Organics (MRO)	11000	5000		mg/Kg	100	4/21/2020 8:09:30 PM
Surr: DNOP	0	55.1-146	S	%Rec	100	4/21/2020 8:09:30 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	4/22/2020 6:17:58 AM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	1.2		mg/Kg	50	4/22/2020 6:09:30 PM
Toluene	11	2.4		mg/Kg	50	4/22/2020 6:09:30 PM
Ethylbenzene	8.6	2.4		mg/Kg	50	4/22/2020 6:09:30 PM
Xylenes, Total	33	4.9		mg/Kg	50	4/22/2020 6:09:30 PM
Surr: 1,2-Dichloroethane-d4	94.6	70-130		%Rec	50	4/22/2020 6:09:30 PM
Surr: 4-Bromofluorobenzene	88.9	70-130		%Rec	50	4/22/2020 6:09:30 PM
Surr: Dibromofluoromethane	99.6	70-130		%Rec	50	4/22/2020 6:09:30 PM
Surr: Toluene-d8	96.5	70-130		%Rec	50	4/22/2020 6:09:30 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	950	240		mg/Kg	50	4/22/2020 6:09:30 PM
Surr: BFB	102	70-130		%Rec	50	4/22/2020 6:09:30 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2004817**
Date Reported: **4/24/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BH20-02 2.5'
Project: Grama Ridge East 34 State 2BS 006H **Collection Date:** 4/15/2020 9:55:00 AM
Lab ID: 2004817-002 **Matrix:** SOIL **Received Date:** 4/17/2020 8:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.4		mg/Kg	1	4/21/2020 5:17:23 PM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	4/21/2020 5:17:23 PM
Surr: DNOP	101	55.1-146		%Rec	1	4/21/2020 5:17:23 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	4/22/2020 6:30:22 AM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.025		mg/Kg	1	4/22/2020 6:37:57 PM
Toluene	ND	0.049		mg/Kg	1	4/22/2020 6:37:57 PM
Ethylbenzene	ND	0.049		mg/Kg	1	4/22/2020 6:37:57 PM
Xylenes, Total	ND	0.099		mg/Kg	1	4/22/2020 6:37:57 PM
Surr: 1,2-Dichloroethane-d4	92.2	70-130		%Rec	1	4/22/2020 6:37:57 PM
Surr: 4-Bromofluorobenzene	97.4	70-130		%Rec	1	4/22/2020 6:37:57 PM
Surr: Dibromofluoromethane	96.2	70-130		%Rec	1	4/22/2020 6:37:57 PM
Surr: Toluene-d8	97.3	70-130		%Rec	1	4/22/2020 6:37:57 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	4/22/2020 6:37:57 PM
Surr: BFB	97.8	70-130		%Rec	1	4/22/2020 6:37:57 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2004817**
Date Reported: **4/24/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BH20-03 1'
Project: Grama Ridge East 34 State 2BS 006H **Collection Date:** 4/15/2020 10:20:00 AM
Lab ID: 2004817-003 **Matrix:** SOIL **Received Date:** 4/17/2020 8:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**
Diesel Range Organics (DRO)	15	9.4		mg/Kg	1	4/21/2020 3:06:51 AM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	4/21/2020 3:06:51 AM
Surr: DNOP	123	55.1-146		%Rec	1	4/21/2020 3:06:51 AM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	4/22/2020 6:42:47 AM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.025		mg/Kg	1	4/22/2020 7:06:25 PM
Toluene	ND	0.050		mg/Kg	1	4/22/2020 7:06:25 PM
Ethylbenzene	ND	0.050		mg/Kg	1	4/22/2020 7:06:25 PM
Xylenes, Total	ND	0.10		mg/Kg	1	4/22/2020 7:06:25 PM
Surr: 1,2-Dichloroethane-d4	91.1	70-130		%Rec	1	4/22/2020 7:06:25 PM
Surr: 4-Bromofluorobenzene	99.9	70-130		%Rec	1	4/22/2020 7:06:25 PM
Surr: Dibromofluoromethane	96.2	70-130		%Rec	1	4/22/2020 7:06:25 PM
Surr: Toluene-d8	95.4	70-130		%Rec	1	4/22/2020 7:06:25 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	4/22/2020 7:06:25 PM
Surr: BFB	96.4	70-130		%Rec	1	4/22/2020 7:06:25 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2004817**
Date Reported: **4/24/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** SS20-01 0-0.5'
Project: Grama Ridge East 34 State 2BS 006H **Collection Date:** 4/15/2020 11:50:00 AM
Lab ID: 2004817-004 **Matrix:** SOIL **Received Date:** 4/17/2020 8:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**
Diesel Range Organics (DRO)	ND	9.9		mg/Kg	1	4/21/2020 3:30:51 AM
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	4/21/2020 3:30:51 AM
Surr: DNOP	122	55.1-146		%Rec	1	4/21/2020 3:30:51 AM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	100	60		mg/Kg	20	4/22/2020 6:55:11 AM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.025		mg/Kg	1	4/22/2020 7:35:03 PM
Toluene	ND	0.049		mg/Kg	1	4/22/2020 7:35:03 PM
Ethylbenzene	ND	0.049		mg/Kg	1	4/22/2020 7:35:03 PM
Xylenes, Total	ND	0.098		mg/Kg	1	4/22/2020 7:35:03 PM
Surr: 1,2-Dichloroethane-d4	92.3	70-130		%Rec	1	4/22/2020 7:35:03 PM
Surr: 4-Bromofluorobenzene	99.7	70-130		%Rec	1	4/22/2020 7:35:03 PM
Surr: Dibromofluoromethane	95.7	70-130		%Rec	1	4/22/2020 7:35:03 PM
Surr: Toluene-d8	95.1	70-130		%Rec	1	4/22/2020 7:35:03 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	4/22/2020 7:35:03 PM
Surr: BFB	96.3	70-130		%Rec	1	4/22/2020 7:35:03 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2004817**
Date Reported: **4/24/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** SS20-03 0-0.5'
Project: Grama Ridge East 34 State 2BS 006H **Collection Date:** 4/15/2020 12:20:00 PM
Lab ID: 2004817-005 **Matrix:** SOIL **Received Date:** 4/17/2020 8:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**
Diesel Range Organics (DRO)	ND	9.8		mg/Kg	1	4/21/2020 3:54:56 AM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	4/21/2020 3:54:56 AM
Surr: DNOP	97.0	55.1-146		%Rec	1	4/21/2020 3:54:56 AM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	140	60		mg/Kg	20	4/22/2020 7:57:14 AM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.025		mg/Kg	1	4/22/2020 8:03:28 PM
Toluene	ND	0.050		mg/Kg	1	4/22/2020 8:03:28 PM
Ethylbenzene	ND	0.050		mg/Kg	1	4/22/2020 8:03:28 PM
Xylenes, Total	ND	0.10		mg/Kg	1	4/22/2020 8:03:28 PM
Surr: 1,2-Dichloroethane-d4	91.4	70-130		%Rec	1	4/22/2020 8:03:28 PM
Surr: 4-Bromofluorobenzene	98.8	70-130		%Rec	1	4/22/2020 8:03:28 PM
Surr: Dibromofluoromethane	95.5	70-130		%Rec	1	4/22/2020 8:03:28 PM
Surr: Toluene-d8	97.8	70-130		%Rec	1	4/22/2020 8:03:28 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	4/22/2020 8:03:28 PM
Surr: BFB	99.7	70-130		%Rec	1	4/22/2020 8:03:28 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2004817**
Date Reported: **4/24/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** SS20-07 0-0.5'
Project: Grama Ridge East 34 State 2BS 006H **Collection Date:** 4/15/2020 1:20:00 PM
Lab ID: 2004817-006 **Matrix:** SOIL **Received Date:** 4/17/2020 8:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**
Diesel Range Organics (DRO)	14	8.7		mg/Kg	1	4/21/2020 4:19:01 AM
Motor Oil Range Organics (MRO)	ND	44		mg/Kg	1	4/21/2020 4:19:01 AM
Surr: DNOP	110	55.1-146		%Rec	1	4/21/2020 4:19:01 AM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	4/22/2020 8:34:28 AM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.025		mg/Kg	1	4/22/2020 8:32:03 PM
Toluene	ND	0.050		mg/Kg	1	4/22/2020 8:32:03 PM
Ethylbenzene	ND	0.050		mg/Kg	1	4/22/2020 8:32:03 PM
Xylenes, Total	ND	0.10		mg/Kg	1	4/22/2020 8:32:03 PM
Surr: 1,2-Dichloroethane-d4	92.4	70-130		%Rec	1	4/22/2020 8:32:03 PM
Surr: 4-Bromofluorobenzene	98.9	70-130		%Rec	1	4/22/2020 8:32:03 PM
Surr: Dibromofluoromethane	95.4	70-130		%Rec	1	4/22/2020 8:32:03 PM
Surr: Toluene-d8	98.0	70-130		%Rec	1	4/22/2020 8:32:03 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	4/22/2020 8:32:03 PM
Surr: BFB	99.5	70-130		%Rec	1	4/22/2020 8:32:03 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2004817**
Date Reported: **4/24/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** SS20-09 0-0.5'
Project: Grama Ridge East 34 State 2BS 006H **Collection Date:** 4/15/2020 1:40:00 PM
Lab ID: 2004817-007 **Matrix:** SOIL **Received Date:** 4/17/2020 8:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**
Diesel Range Organics (DRO)	ND	9.2		mg/Kg	1	4/21/2020 4:42:57 AM
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	4/21/2020 4:42:57 AM
Surr: DNOP	89.8	55.1-146		%Rec	1	4/21/2020 4:42:57 AM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	4/22/2020 9:11:42 AM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.024		mg/Kg	1	4/22/2020 9:00:40 PM
Toluene	ND	0.049		mg/Kg	1	4/22/2020 9:00:40 PM
Ethylbenzene	ND	0.049		mg/Kg	1	4/22/2020 9:00:40 PM
Xylenes, Total	ND	0.097		mg/Kg	1	4/22/2020 9:00:40 PM
Surr: 1,2-Dichloroethane-d4	93.0	70-130		%Rec	1	4/22/2020 9:00:40 PM
Surr: 4-Bromofluorobenzene	102	70-130		%Rec	1	4/22/2020 9:00:40 PM
Surr: Dibromofluoromethane	97.7	70-130		%Rec	1	4/22/2020 9:00:40 PM
Surr: Toluene-d8	96.0	70-130		%Rec	1	4/22/2020 9:00:40 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	4/22/2020 9:00:40 PM
Surr: BFB	97.8	70-130		%Rec	1	4/22/2020 9:00:40 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2004817**

24-Apr-20

Client: Vertex Resource Group Ltd.

Project: Grama Ridge East 34 State 2BS 006H

Sample ID: **MB-52001**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS**	Batch ID: **52001**	RunNo: **68314**
Prep Date: **4/21/2020**	Analysis Date: **4/22/2020**	SeqNo: **2363548** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-52001**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS**	Batch ID: **52001**	RunNo: **68314**
Prep Date: **4/21/2020**	Analysis Date: **4/22/2020**	SeqNo: **2363549** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	15	1.5	15.00	0	96.7	90	110			

Sample ID: **MB-52006**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS**	Batch ID: **52006**	RunNo: **68333**
Prep Date: **4/22/2020**	Analysis Date: **4/22/2020**	SeqNo: **2364826** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-52006**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS**	Batch ID: **52006**	RunNo: **68333**
Prep Date: **4/22/2020**	Analysis Date: **4/22/2020**	SeqNo: **2364827** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	93.6	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2004817**

24-Apr-20

Client: Vertex Resource Group Ltd.

Project: Grama Ridge East 34 State 2BS 006H

Sample ID: **LCS-51945**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **51945**	RunNo: **68265**
Prep Date: **4/19/2020**	Analysis Date: **4/20/2020**	SeqNo: **2361902** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	54	10	50.00	0	108	70	130			
Surr: DNOP	3.7		5.000		73.6	55.1	146			

Sample ID: **MB-51945**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **51945**	RunNo: **68265**
Prep Date: **4/19/2020**	Analysis Date: **4/20/2020**	SeqNo: **2361904** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	7.4		10.00		74.4	55.1	146			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2004817**

24-Apr-20

Client: Vertex Resource Group Ltd.

Project: Grama Ridge East 34 State 2BS 006H

Sample ID: **mb-51926**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS**	Batch ID: **51926**	RunNo: **68351**
Prep Date: **4/18/2020**	Analysis Date: **4/22/2020**	SeqNo: **2364735** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.46		0.5000		92.8	70	130			
Surr: 4-Bromofluorobenzene	0.50		0.5000		99.9	70	130			
Surr: Dibromofluoromethane	0.49		0.5000		97.4	70	130			
Surr: Toluene-d8	0.49		0.5000		98.1	70	130			

Sample ID: **mb-51993**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS**	Batch ID: **51993**	RunNo: **68351**
Prep Date: **4/21/2020**	Analysis Date: **4/23/2020**	SeqNo: **2364736** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	0.46		0.5000		91.5	70	130			
Surr: 4-Bromofluorobenzene	0.50		0.5000		100	70	130			
Surr: Dibromofluoromethane	0.49		0.5000		98.6	70	130			
Surr: Toluene-d8	0.50		0.5000		100	70	130			

Sample ID: **lcs-51926**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **LCSS**	Batch ID: **51926**	RunNo: **68351**
Prep Date: **4/18/2020**	Analysis Date: **4/22/2020**	SeqNo: **2364760** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.93	0.025	1.000	0	93.3	70	130			
Toluene	1.1	0.050	1.000	0	106	70	130			
Surr: 1,2-Dichloroethane-d4	0.47		0.5000		94.2	70	130			
Surr: 4-Bromofluorobenzene	0.50		0.5000		100	70	130			
Surr: Dibromofluoromethane	0.50		0.5000		99.8	70	130			
Surr: Toluene-d8	0.49		0.5000		97.7	70	130			

Sample ID: **lcs-51993**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **LCSS**	Batch ID: **51993**	RunNo: **68351**
Prep Date: **4/21/2020**	Analysis Date: **4/23/2020**	SeqNo: **2364761** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 1,2-Dichloroethane-d4	0.46		0.5000		91.0	70	130			
Surr: 4-Bromofluorobenzene	0.49		0.5000		98.0	70	130			
Surr: Dibromofluoromethane	0.49		0.5000		98.9	70	130			
Surr: Toluene-d8	0.50		0.5000		100	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2004817**

24-Apr-20

Client: Vertex Resource Group Ltd.

Project: Grama Ridge East 34 State 2BS 006H

Sample ID: **mb-51926**	SampType: **MBLK**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **PBS**	Batch ID: **51926**	RunNo: **68351**
Prep Date: **4/18/2020**	Analysis Date: **4/22/2020**	SeqNo: **2364764** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	480		500.0		97.0	70	130			

Sample ID: **mb-51993**	SampType: **MBLK**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **PBS**	Batch ID: **51993**	RunNo: **68351**
Prep Date: **4/21/2020**	Analysis Date: **4/23/2020**	SeqNo: **2364765** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	510		500.0		101	70	130			

Sample ID: **lcs-51926**	SampType: **LCS**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **LCSS**	Batch ID: **51926**	RunNo: **68351**
Prep Date: **4/18/2020**	Analysis Date: **4/22/2020**	SeqNo: **2364787** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	24	5.0	25.00	0	95.4	70	130			
Surr: BFB	490		500.0		98.8	70	130			

Sample ID: **lcs-51993**	SampType: **LCS**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **LCSS**	Batch ID: **51993**	RunNo: **68351**
Prep Date: **4/21/2020**	Analysis Date: **4/23/2020**	SeqNo: **2364788** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: BFB	490		500.0		98.7	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: VERTEX CARLSBAD Work Order Number: 2004817 RcptNo: 1

Received By: Juan Rojas 4/17/2020 8:45:00 AM

Completed By: Desiree Dominguez 4/17/2020 9:40:13 AM

Reviewed By: JR 4/17/20

Chain of Custody

1. Is Chain of Custody sufficiently complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Courier		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. Received at least 1 vial with headspace <1/4" for AQ VOA?	Yes ☐	No ☐	NA ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: (<2 or >12 unless noted)

Adjusted?

Checked by: DAD 4/17/20

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: Date:

By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding:

Client Instructions:

16. Additional remarks:

17. Cooler Information

Chain-of-Custody Record

Client: Vertex
Natalie Gordon
Mailing Address: On File

Phone #:
email or Fax#:
QA/QC Package:
☐ Standard ☐ Level 4 (Full Validation)
Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other
☐ EDD (Type)

Turn-Around Time: 5 Day
☑ Standard ☐ Rush
Project Name: Grama Ridge East 34 State 2BS 006H
Project #: 20E-00504
Project Manager: Natalie Gordon
Sampler: MJP
On Ice: ☑ Yes ☐ No
# of Coolers: 1
Cooler Temp(including CF): 5.5-0=5.5 (°C)

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2004817	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)
4/15	9:25	Soil	BH20-02 0'	4oz	ice	-001	✓	✓					✓			
	9:55		BH20-02 2.5'			-002	✓	✓					✓			
	10:20		BH20-03 1'			-003	✓	✓					✓			
	11:50		SS20-01 0-0.5'			-004	✓	✓					✓			
	12:20		SS20-03 0-0.5'			-005	✓	✓					✓			
	1:20		SS20-07 0-0.5'			-006	✓	✓					✓			
	1:40		SS20-09 0-0.5'			-007	✓	✓					✓			

Date	Time	Relinquished by	Received by	Via	Date	Time
4/15	13:00				4/16	1300
4/16	1900			courier	4/17/20	8:45

Remarks: CC: Natalie Gordon

3 Bears

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

June 02, 2020

Natalie Gordon

Vertex Resource Group Ltd.
3101 Boyd Drive
Carlsbad, NM 88220
TEL: (505) 506-0040
FAX:

RE: Grama Ridge East 34 State 2135 006H OrderNo.: 2005A40

Dear Natalie Gordon:

Hall Environmental Analysis Laboratory received 8 sample(s) on 5/23/2020 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **2005A40**
Date Reported: **6/2/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BS20-09 0.5'
Project: Grama Ridge East 34 State 2135 006H **Collection Date:** 5/21/2020 11:00:00 AM
Lab ID: 2005A40-001 **Matrix:** SOIL **Received Date:** 5/23/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **CLP**
Diesel Range Organics (DRO)	650	8.6		mg/Kg	1	5/27/2020 3:45:37 PM
Motor Oil Range Organics (MRO)	300	43		mg/Kg	1	5/27/2020 3:45:37 PM
Surr: DNOP	116	55.1-146		%Rec	1	5/27/2020 3:45:37 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	5/29/2020 10:49:44 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.12		mg/Kg	5	5/27/2020 2:51:01 PM
Toluene	ND	0.25		mg/Kg	5	5/27/2020 2:51:01 PM
Ethylbenzene	ND	0.25		mg/Kg	5	5/27/2020 2:51:01 PM
Xylenes, Total	ND	0.49		mg/Kg	5	5/27/2020 2:51:01 PM
Surr: 1,2-Dichloroethane-d4	99.4	70-130		%Rec	5	5/27/2020 2:51:01 PM
Surr: 4-Bromofluorobenzene	93.9	70-130		%Rec	5	5/27/2020 2:51:01 PM
Surr: Dibromofluoromethane	108	70-130		%Rec	5	5/27/2020 2:51:01 PM
Surr: Toluene-d8	99.3	70-130		%Rec	5	5/27/2020 2:51:01 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	25		mg/Kg	5	5/27/2020 2:51:01 PM
Surr: BFB	100	70-130		%Rec	5	5/27/2020 2:51:01 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2005A40**
Date Reported: **6/2/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS20-10 0.5'
Project: Grama Ridge East 34 State 2135 006H
Collection Date: 5/21/2020 5:00:00 AM
Lab ID: 2005A40-002 **Matrix:** SOIL
Received Date: 5/23/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **CLP**
Diesel Range Organics (DRO)	320	8.6		mg/Kg	1	5/28/2020 1:28:41 PM
Motor Oil Range Organics (MRO)	120	43		mg/Kg	1	5/28/2020 1:28:41 PM
Surr: DNOP	129	55.1-146		%Rec	1	5/28/2020 1:28:41 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	5/29/2020 11:02:09 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.12		mg/Kg	5	5/27/2020 3:19:35 PM
Toluene	ND	0.24		mg/Kg	5	5/27/2020 3:19:35 PM
Ethylbenzene	ND	0.24		mg/Kg	5	5/27/2020 3:19:35 PM
Xylenes, Total	ND	0.47		mg/Kg	5	5/27/2020 3:19:35 PM
Surr: 1,2-Dichloroethane-d4	103	70-130		%Rec	5	5/27/2020 3:19:35 PM
Surr: 4-Bromofluorobenzene	90.4	70-130		%Rec	5	5/27/2020 3:19:35 PM
Surr: Dibromofluoromethane	108	70-130		%Rec	5	5/27/2020 3:19:35 PM
Surr: Toluene-d8	101	70-130		%Rec	5	5/27/2020 3:19:35 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	24		mg/Kg	5	5/27/2020 3:19:35 PM
Surr: BFB	99.7	70-130		%Rec	5	5/27/2020 3:19:35 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2005A40**
Date Reported: **6/2/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BS20-11 1.5'
Project: Grama Ridge East 34 State 2135 006H **Collection Date:** 5/21/2020 12:00:00 PM
Lab ID: 2005A40-003 **Matrix:** SOIL **Received Date:** 5/23/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **CLP**
Diesel Range Organics (DRO)	1500	97		mg/Kg	10	5/28/2020 2:18:25 PM
Motor Oil Range Organics (MRO)	600	480		mg/Kg	10	5/28/2020 2:18:25 PM
Surr: DNOP	0	55.1-146	S	%Rec	10	5/28/2020 2:18:25 PM
EPA METHOD 300.0: ANIONS						Analyst: **MRA**
Chloride	2500	150		mg/Kg	50	6/1/2020 6:50:12 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.12		mg/Kg	5	5/27/2020 3:48:11 PM
Toluene	ND	0.25		mg/Kg	5	5/27/2020 3:48:11 PM
Ethylbenzene	ND	0.25		mg/Kg	5	5/27/2020 3:48:11 PM
Xylenes, Total	ND	0.49		mg/Kg	5	5/27/2020 3:48:11 PM
Surr: 1,2-Dichloroethane-d4	98.0	70-130		%Rec	5	5/27/2020 3:48:11 PM
Surr: 4-Bromofluorobenzene	82.6	70-130		%Rec	5	5/27/2020 3:48:11 PM
Surr: Dibromofluoromethane	103	70-130		%Rec	5	5/27/2020 3:48:11 PM
Surr: Toluene-d8	99.6	70-130		%Rec	5	5/27/2020 3:48:11 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	63	25		mg/Kg	5	5/27/2020 3:48:11 PM
Surr: BFB	99.7	70-130		%Rec	5	5/27/2020 3:48:11 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2005A40**
Date Reported: **6/2/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BS20-12 1'
Project: Grama Ridge East 34 State 2135 006H **Collection Date:** 5/21/2020 12:30:00 PM
Lab ID: 2005A40-004 **Matrix:** SOIL **Received Date:** 5/23/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **CLP**
Diesel Range Organics (DRO)	1300	43		mg/Kg	5	5/28/2020 2:43:23 PM
Motor Oil Range Organics (MRO)	470	220		mg/Kg	5	5/28/2020 2:43:23 PM
Surr: DNOP	121	55.1-146		%Rec	5	5/28/2020 2:43:23 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	61	60		mg/Kg	20	5/29/2020 11:26:57 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.12		mg/Kg	5	5/27/2020 4:16:44 PM
Toluene	ND	0.24		mg/Kg	5	5/27/2020 4:16:44 PM
Ethylbenzene	ND	0.24		mg/Kg	5	5/27/2020 4:16:44 PM
Xylenes, Total	1.1	0.47		mg/Kg	5	5/27/2020 4:16:44 PM
Surr: 1,2-Dichloroethane-d4	98.0	70-130		%Rec	5	5/27/2020 4:16:44 PM
Surr: 4-Bromofluorobenzene	76.2	70-130		%Rec	5	5/27/2020 4:16:44 PM
Surr: Dibromofluoromethane	104	70-130		%Rec	5	5/27/2020 4:16:44 PM
Surr: Toluene-d8	98.6	70-130		%Rec	5	5/27/2020 4:16:44 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	92	24		mg/Kg	5	5/27/2020 4:16:44 PM
Surr: BFB	104	70-130		%Rec	5	5/27/2020 4:16:44 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2005A40**
Date Reported: **6/2/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BS20-13 0.5'
Project: Grama Ridge East 34 State 2135 006H **Collection Date:** 5/21/2020 12:45:00 PM
Lab ID: 2005A40-005 **Matrix:** SOIL **Received Date:** 5/23/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **CLP**
Diesel Range Organics (DRO)	460	9.6		mg/Kg	1	5/27/2020 6:14:38 PM
Motor Oil Range Organics (MRO)	320	48		mg/Kg	1	5/27/2020 6:14:38 PM
Surr: DNOP	118	55.1-146		%Rec	1	5/27/2020 6:14:38 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	1900	59		mg/Kg	20	5/29/2020 11:39:22 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.12		mg/Kg	5	5/27/2020 4:45:18 PM
Toluene	ND	0.23		mg/Kg	5	5/27/2020 4:45:18 PM
Ethylbenzene	ND	0.23		mg/Kg	5	5/27/2020 4:45:18 PM
Xylenes, Total	ND	0.46		mg/Kg	5	5/27/2020 4:45:18 PM
Surr: 1,2-Dichloroethane-d4	101	70-130		%Rec	5	5/27/2020 4:45:18 PM
Surr: 4-Bromofluorobenzene	92.8	70-130		%Rec	5	5/27/2020 4:45:18 PM
Surr: Dibromofluoromethane	102	70-130		%Rec	5	5/27/2020 4:45:18 PM
Surr: Toluene-d8	107	70-130		%Rec	5	5/27/2020 4:45:18 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	23		mg/Kg	5	5/27/2020 4:45:18 PM
Surr: BFB	101	70-130		%Rec	5	5/27/2020 4:45:18 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2005A40**
Date Reported: **6/2/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** WS20-01 0-0.5'
Project: Grama Ridge East 34 State 2135 006H **Collection Date:** 5/21/2020 12:15:00 PM
Lab ID: 2005A40-006 **Matrix:** SOIL **Received Date:** 5/23/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **CLP**
Diesel Range Organics (DRO)	16	8.5		mg/Kg	1	5/28/2020 3:08:27 PM
Motor Oil Range Organics (MRO)	ND	42		mg/Kg	1	5/28/2020 3:08:27 PM
Surr: DNOP	106	55.1-146		%Rec	1	5/28/2020 3:08:27 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	430	59		mg/Kg	20	5/29/2020 11:51:47 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.025		mg/Kg	1	5/27/2020 5:13:59 PM
Toluene	ND	0.049		mg/Kg	1	5/27/2020 5:13:59 PM
Ethylbenzene	ND	0.049		mg/Kg	1	5/27/2020 5:13:59 PM
Xylenes, Total	ND	0.099		mg/Kg	1	5/27/2020 5:13:59 PM
Surr: 1,2-Dichloroethane-d4	97.1	70-130		%Rec	1	5/27/2020 5:13:59 PM
Surr: 4-Bromofluorobenzene	92.3	70-130		%Rec	1	5/27/2020 5:13:59 PM
Surr: Dibromofluoromethane	102	70-130		%Rec	1	5/27/2020 5:13:59 PM
Surr: Toluene-d8	107	70-130		%Rec	1	5/27/2020 5:13:59 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	5/27/2020 5:13:59 PM
Surr: BFB	101	70-130		%Rec	1	5/27/2020 5:13:59 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2005A40**
Date Reported: **6/2/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** WS20-02 0-0.5'
Project: Grama Ridge East 34 State 2135 006H **Collection Date:** 5/21/2020 5:30:00 AM
Lab ID: 2005A40-007 **Matrix:** SOIL **Received Date:** 5/23/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **CLP**
Diesel Range Organics (DRO)	ND	8.9		mg/Kg	1	5/27/2020 7:04:14 PM
Motor Oil Range Organics (MRO)	ND	45		mg/Kg	1	5/27/2020 7:04:14 PM
Surr: DNOP	106	55.1-146		%Rec	1	5/27/2020 7:04:14 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	110	60		mg/Kg	20	5/30/2020 12:04:12 AM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.023		mg/Kg	1	5/27/2020 5:42:36 PM
Toluene	ND	0.046		mg/Kg	1	5/27/2020 5:42:36 PM
Ethylbenzene	ND	0.046		mg/Kg	1	5/27/2020 5:42:36 PM
Xylenes, Total	ND	0.092		mg/Kg	1	5/27/2020 5:42:36 PM
Surr: 1,2-Dichloroethane-d4	96.2	70-130		%Rec	1	5/27/2020 5:42:36 PM
Surr: 4-Bromofluorobenzene	97.7	70-130		%Rec	1	5/27/2020 5:42:36 PM
Surr: Dibromofluoromethane	99.2	70-130		%Rec	1	5/27/2020 5:42:36 PM
Surr: Toluene-d8	99.6	70-130		%Rec	1	5/27/2020 5:42:36 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	4.6		mg/Kg	1	5/27/2020 5:42:36 PM
Surr: BFB	101	70-130		%Rec	1	5/27/2020 5:42:36 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2005A40**
Date Reported: **6/2/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** WS20-03 0-0.5'
Project: Grama Ridge East 34 State 2135 006H **Collection Date:** 5/21/2020 5:15:00 AM
Lab ID: 2005A40-008 **Matrix:** SOIL **Received Date:** 5/23/2020 8:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **CLP**
Diesel Range Organics (DRO)	30	9.2		mg/Kg	1	5/27/2020 7:28:54 PM
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	5/27/2020 7:28:54 PM
Surr: DNOP	94.8	55.1-146		%Rec	1	5/27/2020 7:28:54 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	240	60		mg/Kg	20	5/30/2020 6:53:43 AM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.024		mg/Kg	1	5/27/2020 6:11:11 PM
Toluene	ND	0.048		mg/Kg	1	5/27/2020 6:11:11 PM
Ethylbenzene	ND	0.048		mg/Kg	1	5/27/2020 6:11:11 PM
Xylenes, Total	ND	0.096		mg/Kg	1	5/27/2020 6:11:11 PM
Surr: 1,2-Dichloroethane-d4	96.0	70-130		%Rec	1	5/27/2020 6:11:11 PM
Surr: 4-Bromofluorobenzene	94.5	70-130		%Rec	1	5/27/2020 6:11:11 PM
Surr: Dibromofluoromethane	103	70-130		%Rec	1	5/27/2020 6:11:11 PM
Surr: Toluene-d8	100	70-130		%Rec	1	5/27/2020 6:11:11 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	5/27/2020 6:11:11 PM
Surr: BFB	98.1	70-130		%Rec	1	5/27/2020 6:11:11 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2005A40**
02-Jun-20

Client: Vertex Resource Group Ltd.
Project: Grama Ridge East 34 State 2135 006H

Sample ID: **MB-52772**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBS**	Batch ID: **52772**	RunNo: **69282**							
Prep Date: **5/29/2020**	Analysis Date: **5/29/2020**	SeqNo: **2401855**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-52772**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSS**	Batch ID: **52772**	RunNo: **69282**							
Prep Date: **5/29/2020**	Analysis Date: **5/29/2020**	SeqNo: **2401856**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	92.4	90	110			

Sample ID: **MB-52775**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBS**	Batch ID: **52775**	RunNo: **69282**							
Prep Date: **5/29/2020**	Analysis Date: **5/30/2020**	SeqNo: **2401885**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-52775**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSS**	Batch ID: **52775**	RunNo: **69282**							
Prep Date: **5/29/2020**	Analysis Date: **5/30/2020**	SeqNo: **2401886**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	93.4	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2005A40**
02-Jun-20

Client: Vertex Resource Group Ltd.
Project: Grama Ridge East 34 State 2135 006H

Sample ID: **MB-52681**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**							
Client ID: **PBS**	Batch ID: **52681**	RunNo: **69134**							
Prep Date: **5/26/2020**	Analysis Date: **5/27/2020**	SeqNo: **2397783**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	10		10.00		102	55.1	146			

Sample ID: **LCS-52681**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**							
Client ID: **LCSS**	Batch ID: **52681**	RunNo: **69134**							
Prep Date: **5/26/2020**	Analysis Date: **5/27/2020**	SeqNo: **2397784**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	53	10	50.00	0	107	70	130			
Surr: DNOP	5.1		5.000		102	55.1	146			

Sample ID: **MB-52679**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**							
Client ID: **PBS**	Batch ID: **52679**	RunNo: **69206**							
Prep Date: **5/26/2020**	Analysis Date: **5/28/2020**	SeqNo: **2398752**	Units: **%Rec**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	8.8		10.00		88.5	55.1	146			

Sample ID: **LCS-52679**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**							
Client ID: **LCSS**	Batch ID: **52679**	RunNo: **69206**							
Prep Date: **5/26/2020**	Analysis Date: **5/28/2020**	SeqNo: **2398753**	Units: **%Rec**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	4.0		5.000		80.9	55.1	146			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2005A40**
02-Jun-20

Client: Vertex Resource Group Ltd.
Project: Grama Ridge East 34 State 2135 006H

Sample ID: **mb-52673** SampType: **MBLK** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS** Batch ID: **52673** RunNo: **69151**
Prep Date: **5/25/2020** Analysis Date: **5/27/2020** SeqNo: **2396572** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.48		0.5000		96.0	70	130			
Surr: 4-Bromofluorobenzene	0.48		0.5000		95.5	70	130			
Surr: Dibromofluoromethane	0.53		0.5000		105	70	130			
Surr: Toluene-d8	0.52		0.5000		104	70	130			

Sample ID: **lcs-52673** SampType: **LCS4** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **BatchQC** Batch ID: **52673** RunNo: **69151**
Prep Date: **5/25/2020** Analysis Date: **5/27/2020** SeqNo: **2396573** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.98	0.025	1.000	0	97.6	80	120			
Toluene	1.0	0.050	1.000	0	105	80	120			
Ethylbenzene	1.1	0.050	1.000	0	106	80	120			
Xylenes, Total	3.1	0.10	3.000	0	103	80	120			
Surr: 1,2-Dichloroethane-d4	0.50		0.5000		99.5	70	130			
Surr: 4-Bromofluorobenzene	0.49		0.5000		97.3	70	130			
Surr: Dibromofluoromethane	0.50		0.5000		100	70	130			
Surr: Toluene-d8	0.51		0.5000		103	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2005A40**

02-Jun-20

Client: Vertex Resource Group Ltd.

Project: Grama Ridge East 34 State 2135 006H

Sample ID: **mb-52673**	SampType: **MBLK**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **PBS**	Batch ID: **52673**	RunNo: **69151**
Prep Date: **5/25/2020**	Analysis Date: **5/27/2020**	SeqNo: **2397031** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	490		500.0		97.2	70	130			

Sample ID: **lcs-52673**	SampType: **LCS**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **LCSS**	Batch ID: **52673**	RunNo: **69151**
Prep Date: **5/25/2020**	Analysis Date: **5/27/2020**	SeqNo: **2397032** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	19	5.0	25.00	0	77.3	70	130			
Surr: BFB	490		500.0		97.1	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: VERTEX CARLSBAD Work Order Number: 2005A40 RcptNo: 1

Received By: **Juan Rojas** 5/23/2020 8:00:00 AM

Completed By: **Juan Rojas** 5/23/2020 8:22:43 AM

Reviewed By: 05/23/20

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Courier		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. Received at least 1 vial with headspace <1/4" for AQ VOA?	Yes ☐	No ☐	NA ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)

Adjusted? _____

Checked by: JR 5/23/20

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	0.8	Good				

Chain-of-Custody Record

Client: Vertex

Mailing Address:

Phone #:

email or Fax#:

QA/QC Package:
☐ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time: 5 Day
☑ Standard ☐ Rush

Project Name: Gramma Ridge East 34 State 235 006H

Project #: 20E-00504

Project Manager: Natalie Gordon

Sampler: MJP

On Ice: ☑ Yes ☐ No

# of Coolers: 1

Cooler Temp(including CF): 0.8-0=0.8 (°C)

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2005A410	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)
5/21	11:00	Soil	BS20-09 0.5'	4 oz	ice	-001	✓	✓					✓			
	5:00		BS20-10 0.5'			-002	✓	✓					✓			
	12:00		BS20-11 1.5'			-003	✓	✓					✓			
	12:30		BS20-12 1'			-004	✓	✓					✓			
	12:45		BS20-13 0.5'			-005	✓	✓					✓			
	~~12:45~~		~~BS20~~			~~-006~~ 006										
	~~12:55~~		WS20-01 0-0.5'			006 ~~007~~ 007	✓	✓					✓			
	5:30		WS20-02 0-0.5'			~~007~~ 007 ~~008~~ 008	✓	✓					✓			
	5:15		WS20-03 0-0.5'			~~008-009~~ 008-009	✓	✓					✓			

Date	Time	Relinquished by	Received by	Via	Date	Time
5/22	AM				5/22	1200
5/22	1900			courier	5/23/20	8:00

Remarks: CC: Natalie Gordon

3 Bear Energy

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: clients.hallenvironmental.com

July 23, 2020

Natalie Gordon

Vertex Resource Group Ltd.
3101 Boyd Drive
Carlsbad, NM 88220
TEL: (505) 506-0040
FAX:

RE: Grama Ridge East 34 OrderNo.: 2007899

Dear Natalie Gordon:

Hall Environmental Analysis Laboratory received 3 sample(s) on 7/17/2020 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **2007899**
Date Reported: **7/23/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS20-04 0'
Project: Grama Ridge East 34
Collection Date: 7/15/2020 8:00:00 AM
Lab ID: 2007899-001 **Matrix:** SOIL **Received Date:** 7/17/2020 11:10:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	120	60		mg/Kg	20	7/22/2020 3:04:01 AM	53881
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**	
Gasoline Range Organics (GRO)	ND	4.6		mg/Kg	1	7/22/2020 12:58:16 AM	53809
Surr: BFB	102	70-130		%Rec	1	7/22/2020 12:58:16 AM	53809
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	7/22/2020 11:17:14 PM	53860
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	7/22/2020 11:17:14 PM	53860
Surr: DNOP	122	55.1-146		%Rec	1	7/22/2020 11:17:14 PM	53860
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**	
Benzene	ND	0.023		mg/Kg	1	7/22/2020 12:58:16 AM	53809
Toluene	ND	0.046		mg/Kg	1	7/22/2020 12:58:16 AM	53809
Ethylbenzene	ND	0.046		mg/Kg	1	7/22/2020 12:58:16 AM	53809
Xylenes, Total	ND	0.092		mg/Kg	1	7/22/2020 12:58:16 AM	53809
Surr: 1,2-Dichloroethane-d4	103	70-130		%Rec	1	7/22/2020 12:58:16 AM	53809
Surr: 4-Bromofluorobenzene	92.1	70-130		%Rec	1	7/22/2020 12:58:16 AM	53809
Surr: Dibromofluoromethane	106	70-130		%Rec	1	7/22/2020 12:58:16 AM	53809
Surr: Toluene-d8	107	70-130		%Rec	1	7/22/2020 12:58:16 AM	53809

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Analytical Report
Lab Order **2007899**
Date Reported: **7/23/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BS20-06 0'
Project: Grama Ridge East 34 **Collection Date:** 7/15/2020 10:45:00 AM
Lab ID: 2007899-002 **Matrix:** SOIL **Received Date:** 7/17/2020 11:10:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	ND	60		mg/Kg	20	7/22/2020 3:41:14 AM	53881
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**	
Gasoline Range Organics (GRO)	ND	4.6		mg/Kg	1	7/22/2020 1:26:52 AM	53809
Surr: BFB	96.5	70-130		%Rec	1	7/22/2020 1:26:52 AM	53809
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	14	9.1		mg/Kg	1	7/22/2020 11:27:31 PM	53860
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	7/22/2020 11:27:31 PM	53860
Surr: DNOP	88.0	55.1-146		%Rec	1	7/22/2020 11:27:31 PM	53860
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**	
Benzene	ND	0.023		mg/Kg	1	7/22/2020 1:26:52 AM	53809
Toluene	ND	0.046		mg/Kg	1	7/22/2020 1:26:52 AM	53809
Ethylbenzene	ND	0.046		mg/Kg	1	7/22/2020 1:26:52 AM	53809
Xylenes, Total	ND	0.093		mg/Kg	1	7/22/2020 1:26:52 AM	53809
Surr: 1,2-Dichloroethane-d4	107	70-130		%Rec	1	7/22/2020 1:26:52 AM	53809
Surr: 4-Bromofluorobenzene	90.0	70-130		%Rec	1	7/22/2020 1:26:52 AM	53809
Surr: Dibromofluoromethane	112	70-130		%Rec	1	7/22/2020 1:26:52 AM	53809
Surr: Toluene-d8	105	70-130		%Rec	1	7/22/2020 1:26:52 AM	53809

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

Analytical Report
Lab Order **2007899**
Date Reported: **7/23/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BS20-08 0'
Project: Grama Ridge East 34 **Collection Date:** 7/15/2020 9:00:00 AM
Lab ID: 2007899-003 **Matrix:** SOIL **Received Date:** 7/17/2020 11:10:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	250	60		mg/Kg	20	7/22/2020 3:53:38 AM	53881
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**	
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	7/22/2020 1:55:23 AM	53809
Surr: BFB	95.1	70-130		%Rec	1	7/22/2020 1:55:23 AM	53809
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**	
Diesel Range Organics (DRO)	17	9.2		mg/Kg	1	7/22/2020 11:37:45 PM	53860
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	7/22/2020 11:37:45 PM	53860
Surr: DNOP	125	55.1-146		%Rec	1	7/22/2020 11:37:45 PM	53860
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**	
Benzene	ND	0.025		mg/Kg	1	7/22/2020 1:55:23 AM	53809
Toluene	ND	0.049		mg/Kg	1	7/22/2020 1:55:23 AM	53809
Ethylbenzene	ND	0.049		mg/Kg	1	7/22/2020 1:55:23 AM	53809
Xylenes, Total	ND	0.098		mg/Kg	1	7/22/2020 1:55:23 AM	53809
Surr: 1,2-Dichloroethane-d4	104	70-130		%Rec	1	7/22/2020 1:55:23 AM	53809
Surr: 4-Bromofluorobenzene	85.4	70-130		%Rec	1	7/22/2020 1:55:23 AM	53809
Surr: Dibromofluoromethane	108	70-130		%Rec	1	7/22/2020 1:55:23 AM	53809
Surr: Toluene-d8	105	70-130		%Rec	1	7/22/2020 1:55:23 AM	53809

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2007899**

23-Jul-20

Client: Vertex Resource Group Ltd.

Project: Grama Ridge East 34

Sample ID: **MB-53881**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS**	Batch ID: **53881**	RunNo: **70511**
Prep Date: **7/21/2020**	Analysis Date: **7/21/2020**	SeqNo: **2452695** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-53881**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS**	Batch ID: **53881**	RunNo: **70511**
Prep Date: **7/21/2020**	Analysis Date: **7/21/2020**	SeqNo: **2452696** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	95.2	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2007899**

23-Jul-20

Client: Vertex Resource Group Ltd.

Project: Grama Ridge East 34

Sample ID: **LCS-53889** SampType: **LCS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS** Batch ID: **53889** RunNo: **70513**
Prep Date: **7/22/2020** Analysis Date: **7/22/2020** SeqNo: **2452760** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	5.6		5.000		112	55.1	146			

Sample ID: **MB-53889** SampType: **MBLK** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS** Batch ID: **53889** RunNo: **70513**
Prep Date: **7/22/2020** Analysis Date: **7/22/2020** SeqNo: **2452763** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	12		10.00		122	55.1	146			

Sample ID: **LCS-53858** SampType: **LCS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS** Batch ID: **53858** RunNo: **70513**
Prep Date: **7/21/2020** Analysis Date: **7/22/2020** SeqNo: **2453638** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	5.3		5.000		105	55.1	146			

Sample ID: **LCS-53860** SampType: **LCS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS** Batch ID: **53860** RunNo: **70513**
Prep Date: **7/21/2020** Analysis Date: **7/22/2020** SeqNo: **2453639** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	60	10	50.00	0	120	70	130			
Surr: DNOP	4.7		5.000		94.5	55.1	146			

Sample ID: **MB-53858** SampType: **MBLK** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS** Batch ID: **53858** RunNo: **70513**
Prep Date: **7/21/2020** Analysis Date: **7/22/2020** SeqNo: **2453644** Units: **%Rec**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	12		10.00		124	55.1	146			

Sample ID: **MB-53860** SampType: **MBLK** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS** Batch ID: **53860** RunNo: **70513**
Prep Date: **7/21/2020** Analysis Date: **7/22/2020** SeqNo: **2453648** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	7.8		10.00		77.6	55.1	146			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2007899**
23-Jul-20

Client: Vertex Resource Group Ltd.
Project: Grama Ridge East 34

Sample ID: **mb-53809** SampType: **MBLK** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS** Batch ID: **53809** RunNo: **70485**
Prep Date: **7/19/2020** Analysis Date: **7/21/2020** SeqNo: **2451649** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.50		0.5000		99.9	70	130			
Surr: 4-Bromofluorobenzene	0.47		0.5000		94.1	70	130			
Surr: Dibromofluoromethane	0.49		0.5000		98.7	70	130			
Surr: Toluene-d8	0.53		0.5000		106	70	130			

Sample ID: **lcs-53809** SampType: **LCS4** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **BatchQC** Batch ID: **53809** RunNo: **70485**
Prep Date: **7/19/2020** Analysis Date: **7/20/2020** SeqNo: **2451650** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.97	0.025	1.000	0	97.1	80	120			
Toluene	1.0	0.050	1.000	0	104	80	120			
Ethylbenzene	1.0	0.050	1.000	0	102	80	120			
Xylenes, Total	3.1	0.10	3.000	0	103	80	120			
Surr: 1,2-Dichloroethane-d4	0.50		0.5000		99.8	70	130			
Surr: 4-Bromofluorobenzene	0.47		0.5000		94.3	70	130			
Surr: Dibromofluoromethane	0.49		0.5000		98.5	70	130			
Surr: Toluene-d8	0.53		0.5000		107	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2007899**

23-Jul-20

Client: Vertex Resource Group Ltd.

Project: Grama Ridge East 34

Sample ID: **mb-53809**	SampType: **MBLK**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **PBS**	Batch ID: **53809**	RunNo: **70485**
Prep Date: **7/19/2020**	Analysis Date: **7/21/2020**	SeqNo: **2451618** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	530		500.0		106	70	130			

Sample ID: **lcs-53809**	SampType: **LCS**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **LCSS**	Batch ID: **53809**	RunNo: **70485**
Prep Date: **7/19/2020**	Analysis Date: **7/20/2020**	SeqNo: **2451619** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	22	5.0	25.00	0	86.7	70	130			
Surr: BFB	510		500.0		103	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: clients.hallenvironmental.com

Sample Log-In Check List

Client Name: **Vertex Resource Group Lt** Work Order Number: **2007899** RcptNo: **1**

Received By: **Isaiah Ortiz** **7/17/2020 11:10:00 AM** I-04

Completed By: **Isaiah Ortiz** **7/17/2020 11:17:03 AM** I-04

Reviewed By: LB 7/17/20

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? Courier

Log In

3. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C Yes ☑ No ☐ NA ☐
5. Sample(s) in proper container(s)? Yes ☑ No ☐
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
8. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
9. Received at least 1 vial with headspace <1/4" for AQ VOA? Yes ☐ No ☐ NA ☑
10. Were any sample containers received broken? Yes ☐ No ☑
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)
Adjusted? _____
Checked by: SPA 7.17.20

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date: _____
By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding: _____
Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.9	Good	Not Present			

Chain-of-Custody Record

Client: Vertex

Mailing Address:

Phone #:

email or Fax#:

QA/QC Package:
☐ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other
☐ EDD (Type)

Turn-Around Time: 5 Day
☑ Standard ☐ Rush

Project Name: Grama Ridge East 34

Project #: 20E-00141

Project Manager: Natalie Gordon

Sampler: MJP

On Ice: ■ Yes ☐ No

# of Coolers: 1

Cooler Temp (including CF): 1.9+0.2=2.1 (°C)

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2007819	BTEX	MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)
7/15	8:00	Soil	BS20-04 0'	4 oz	Ice	-001		✓	✓					✓			
↓	10:45	↓	BS20-06 0'	↓	↓	-002		✓	✓					✓			
↓	9:00	↓	BS20-08 0'	↓	↓	-003		✓	✓					✓			

Date	Time	Relinquished by:	Received by:	Via:	Date	Time
7/16/20	1400				7/16/20	1700
7/16/20	1900			courier	7/17/20	1116

Remarks: CC: Natalie Gordon

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: clients.hallenvironmental.com

August 17, 2020

Natalie Gordon

Vertex Resource Group Ltd.
3101 Boyd Drive
Carlsbad, NM 88220
TEL: (505) 506-0040
FAX:

RE: Grama Ridge East 34 OrderNo.: 2008429

Dear Natalie Gordon:

Hall Environmental Analysis Laboratory received 5 sample(s) on 8/8/2020 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **2008429**
Date Reported: **8/17/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BS20-01 0'
Project: Grama Ridge East 34 **Collection Date:** 8/6/2020
Lab ID: 2008429-001 **Matrix:** SOIL **Received Date:** 8/8/2020 8:10:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	8/12/2020 10:03:16 PM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	8/12/2020 10:03:16 PM
Surr: DNOP	109	30.4-154		%Rec	1	8/12/2020 10:03:16 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	59		mg/Kg	20	8/15/2020 7:02:33 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **DJF**
Benzene	ND	0.024		mg/Kg	1	8/13/2020 4:31:19 PM
Toluene	ND	0.048		mg/Kg	1	8/13/2020 4:31:19 PM
Ethylbenzene	ND	0.048		mg/Kg	1	8/13/2020 4:31:19 PM
Xylenes, Total	ND	0.096		mg/Kg	1	8/13/2020 4:31:19 PM
Surr: 1,2-Dichloroethane-d4	98.2	70-130		%Rec	1	8/13/2020 4:31:19 PM
Surr: 4-Bromofluorobenzene	94.1	70-130		%Rec	1	8/13/2020 4:31:19 PM
Surr: Dibromofluoromethane	96.7	70-130		%Rec	1	8/13/2020 4:31:19 PM
Surr: Toluene-d8	110	70-130		%Rec	1	8/13/2020 4:31:19 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **DJF**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	8/13/2020 4:31:19 PM
Surr: BFB	110	70-130		%Rec	1	8/13/2020 4:31:19 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2008429**
Date Reported: **8/17/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BS20-02 0'
Project: Grama Ridge East 34 **Collection Date:** 8/6/2020
Lab ID: 2008429-002 **Matrix:** SOIL **Received Date:** 8/8/2020 8:10:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.8		mg/Kg	1	8/12/2020 10:13:19 PM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	8/12/2020 10:13:19 PM
Surr: DNOP	111	30.4-154		%Rec	1	8/12/2020 10:13:19 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	8/15/2020 7:14:58 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **DJF**
Benzene	ND	0.024		mg/Kg	1	8/13/2020 5:01:36 PM
Toluene	ND	0.049		mg/Kg	1	8/13/2020 5:01:36 PM
Ethylbenzene	ND	0.049		mg/Kg	1	8/13/2020 5:01:36 PM
Xylenes, Total	ND	0.098		mg/Kg	1	8/13/2020 5:01:36 PM
Surr: 1,2-Dichloroethane-d4	95.6	70-130		%Rec	1	8/13/2020 5:01:36 PM
Surr: 4-Bromofluorobenzene	98.8	70-130		%Rec	1	8/13/2020 5:01:36 PM
Surr: Dibromofluoromethane	93.4	70-130		%Rec	1	8/13/2020 5:01:36 PM
Surr: Toluene-d8	106	70-130		%Rec	1	8/13/2020 5:01:36 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **DJF**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	8/13/2020 5:01:36 PM
Surr: BFB	111	70-130		%Rec	1	8/13/2020 5:01:36 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2008429**
Date Reported: **8/17/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BS20-03 0'
Project: Grama Ridge East 34 **Collection Date:** 8/6/2020
Lab ID: 2008429-003 **Matrix:** SOIL **Received Date:** 8/8/2020 8:10:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	8/12/2020 10:23:19 PM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	8/12/2020 10:23:19 PM
Surr: DNOP	91.2	30.4-154		%Rec	1	8/12/2020 10:23:19 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	8/15/2020 7:27:22 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **DJF**
Benzene	ND	0.025		mg/Kg	1	8/13/2020 5:31:47 PM
Toluene	ND	0.049		mg/Kg	1	8/13/2020 5:31:47 PM
Ethylbenzene	ND	0.049		mg/Kg	1	8/13/2020 5:31:47 PM
Xylenes, Total	ND	0.098		mg/Kg	1	8/13/2020 5:31:47 PM
Surr: 1,2-Dichloroethane-d4	96.5	70-130		%Rec	1	8/13/2020 5:31:47 PM
Surr: 4-Bromofluorobenzene	97.2	70-130		%Rec	1	8/13/2020 5:31:47 PM
Surr: Dibromofluoromethane	95.9	70-130		%Rec	1	8/13/2020 5:31:47 PM
Surr: Toluene-d8	106	70-130		%Rec	1	8/13/2020 5:31:47 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **DJF**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	8/13/2020 5:31:47 PM
Surr: BFB	106	70-130		%Rec	1	8/13/2020 5:31:47 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2008429**
Date Reported: **8/17/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BS20-05 0'
Project: Grama Ridge East 34 **Collection Date:** 8/6/2020
Lab ID: 2008429-004 **Matrix:** SOIL **Received Date:** 8/8/2020 8:10:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	8/12/2020 10:33:19 PM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	8/12/2020 10:33:19 PM
Surr: DNOP	87.4	30.4-154		%Rec	1	8/12/2020 10:33:19 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	8/15/2020 7:39:47 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **DJF**
Benzene	ND	0.025		mg/Kg	1	8/13/2020 6:01:56 PM
Toluene	ND	0.049		mg/Kg	1	8/13/2020 6:01:56 PM
Ethylbenzene	ND	0.049		mg/Kg	1	8/13/2020 6:01:56 PM
Xylenes, Total	ND	0.098		mg/Kg	1	8/13/2020 6:01:56 PM
Surr: 1,2-Dichloroethane-d4	95.6	70-130		%Rec	1	8/13/2020 6:01:56 PM
Surr: 4-Bromofluorobenzene	97.2	70-130		%Rec	1	8/13/2020 6:01:56 PM
Surr: Dibromofluoromethane	95.1	70-130		%Rec	1	8/13/2020 6:01:56 PM
Surr: Toluene-d8	107	70-130		%Rec	1	8/13/2020 6:01:56 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **DJF**
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	8/13/2020 6:01:56 PM
Surr: BFB	110	70-130		%Rec	1	8/13/2020 6:01:56 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report
Lab Order **2008429**
Date Reported: **8/17/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BS20-07 0'
Project: Grama Ridge East 34 **Collection Date:** 8/6/2020
Lab ID: 2008429-005 **Matrix:** SOIL **Received Date:** 8/8/2020 8:10:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	ND	8.8		mg/Kg	1	8/12/2020 10:43:21 PM
Motor Oil Range Organics (MRO)	ND	44		mg/Kg	1	8/12/2020 10:43:21 PM
Surr: DNOP	120	30.4-154		%Rec	1	8/12/2020 10:43:21 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	ND	60		mg/Kg	20	8/15/2020 8:54:13 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **DJF**
Benzene	ND	0.023		mg/Kg	1	8/13/2020 6:32:03 PM
Toluene	ND	0.046		mg/Kg	1	8/13/2020 6:32:03 PM
Ethylbenzene	ND	0.046		mg/Kg	1	8/13/2020 6:32:03 PM
Xylenes, Total	ND	0.093		mg/Kg	1	8/13/2020 6:32:03 PM
Surr: 1,2-Dichloroethane-d4	94.6	70-130		%Rec	1	8/13/2020 6:32:03 PM
Surr: 4-Bromofluorobenzene	94.0	70-130		%Rec	1	8/13/2020 6:32:03 PM
Surr: Dibromofluoromethane	93.1	70-130		%Rec	1	8/13/2020 6:32:03 PM
Surr: Toluene-d8	105	70-130		%Rec	1	8/13/2020 6:32:03 PM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **DJF**
Gasoline Range Organics (GRO)	ND	4.6		mg/Kg	1	8/13/2020 6:32:03 PM
Surr: BFB	104	70-130		%Rec	1	8/13/2020 6:32:03 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2008429**

17-Aug-20

Client: Vertex Resource Group Ltd.

Project: Grama Ridge East 34

Sample ID: **MB-54442** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**

Client ID: **PBS** Batch ID: **54442** RunNo: **71100**

Prep Date: **8/15/2020** Analysis Date: **8/15/2020** SeqNo: **2479169** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-54442** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**

Client ID: **LCSS** Batch ID: **54442** RunNo: **71100**

Prep Date: **8/15/2020** Analysis Date: **8/15/2020** SeqNo: **2479170** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	95.9	90	110			

Sample ID: **MB-54436** SampType: **mblk** TestCode: **EPA Method 300.0: Anions**

Client ID: **PBS** Batch ID: **54436** RunNo: **71100**

Prep Date: **8/15/2020** Analysis Date: **8/15/2020** SeqNo: **2479189** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-54436** SampType: **lcs** TestCode: **EPA Method 300.0: Anions**

Client ID: **LCSS** Batch ID: **54436** RunNo: **71100**

Prep Date: **8/15/2020** Analysis Date: **8/15/2020** SeqNo: **2479190** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	96.6	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2008429**
17-Aug-20

Client: Vertex Resource Group Ltd.
Project: Grama Ridge East 34

Sample ID: **LCS-54341** SampType: **LCS** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS** Batch ID: **54341** RunNo: **71030**
Prep Date: **8/11/2020** Analysis Date: **8/12/2020** SeqNo: **2474931** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	61	10	50.00	0	121	70	130			
Surr: DNOP	5.6		5.000		113	30.4	154			

Sample ID: **MB-54341** SampType: **MBLK** TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS** Batch ID: **54341** RunNo: **71030**
Prep Date: **8/11/2020** Analysis Date: **8/12/2020** SeqNo: **2474933** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	13		10.00		129	30.4	154			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2008429**
17-Aug-20

Client: Vertex Resource Group Ltd.
Project: Grama Ridge East 34

Sample ID: **lcs-54308** SampType: **LCS4** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **BatchQC** Batch ID: **54308** RunNo: **71032**
Prep Date: **8/10/2020** Analysis Date: **8/13/2020** SeqNo: **2475178** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.025	1.000	0	99.8	80	120			
Toluene	1.1	0.050	1.000	0	106	80	120			
Ethylbenzene	1.0	0.050	1.000	0	103	80	120			
Xylenes, Total	3.1	0.10	3.000	0	102	80	120			
Surr: 1,2-Dichloroethane-d4	0.49		0.5000		98.5	70	130			
Surr: 4-Bromofluorobenzene	0.51		0.5000		101	70	130			
Surr: Dibromofluoromethane	0.52		0.5000		105	70	130			
Surr: Toluene-d8	0.56		0.5000		113	70	130			

Sample ID: **mb-54308** SampType: **MBLK** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS** Batch ID: **54308** RunNo: **71032**
Prep Date: **8/10/2020** Analysis Date: **8/13/2020** SeqNo: **2475179** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.50		0.5000		99.1	70	130			
Surr: 4-Bromofluorobenzene	0.48		0.5000		96.6	70	130			
Surr: Dibromofluoromethane	0.50		0.5000		101	70	130			
Surr: Toluene-d8	0.55		0.5000		110	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2008429**

17-Aug-20

Client: Vertex Resource Group Ltd.

Project: Grama Ridge East 34

Sample ID: **lcs-54308** SampType: **LCS** TestCode: **EPA Method 8015D Mod: Gasoline Range**

Client ID: **LCSS** Batch ID: **54308** RunNo: **71032**

Prep Date: **8/10/2020** Analysis Date: **8/13/2020** SeqNo: **2475199** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	23	5.0	25.00	0	91.2	70	130			
Surr: BFB	530		500.0		106	70	130			

Sample ID: **mb-54308** SampType: **MBLK** TestCode: **EPA Method 8015D Mod: Gasoline Range**

Client ID: **PBS** Batch ID: **54308** RunNo: **71032**

Prep Date: **8/10/2020** Analysis Date: **8/13/2020** SeqNo: **2475200** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	540		500.0		108	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: clients.hallenvironmental.com

Sample Log-In Check List

Client Name: **Vertex Resource Group Lt** Work Order Number: **2008429** RcptNo: **1**

Received By: **Isaiah Ortiz** **8/8/2020 8:10:00 AM** I Ortiz

Completed By: **Isaiah Ortiz** **8/8/2020 8:35:29 AM** I Ortiz

Reviewed By: DF 8/8/2020

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Courier		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. Received at least 1 vial with headspace <1/4" for AQ VOA?	Yes ☐	No ☐	NA ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

NT

# of preserved bottles checked for pH: 8/8/20

(<2 or >12 unless noted)

Adjusted?

Checked by:

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: Date:

By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding:

Client Instructions:

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	3.6	Good	Not Present			

Chain-of-Custody Record

Client: Vertex

Mailing Address:

Phone #:

email or Fax#:

QA/QC Package:
☐ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time: 5 Day
☑ Standard ☐ Rush

Project Name: Grama Ridge East 34

Project #: 20E-00504

Project Manager: Natalie Gordon

Sampler: MJP

On Ice: ☑ Yes ☐ No

# of Coolers: 1

Cooler Temp(including CF): 3.6 +0 (CF) 3.6 (°C)

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2008429	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)
8/6		Soil	BS20-01 0'	4 oz	Ice	001	✓	✓					✓			
↓		↓	BS20-02 0'	↓	↓	002	✓	✓					✓			
			BS20-03 0'			003	✓	✓					✓			
			BS20-05 0'			004	✓	✓					✓			
↓		↓	BS20-07 0'	↓	↓	005	✓	✓					✓			

Analysis Request

Date	Time	Relinquished by:	Received by:	Via:	Date	Time
			Ccummings		8/7/20	1075
8/7/20	1900	Ccummings				
				Courier	8/8/20	0810

Remarks: cc: Natalie Gordon

3 Bears

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: clients.hallenvironmental.com

September 01, 2020

Natalie Gordon

Vertex Resource Group Ltd.
3101 Boyd Drive
Carlsbad, NM 88220
TEL: (505) 506-0040
FAX

RE: Grama Ridge East 34 OrderNo.: 2008C42

Dear Natalie Gordon:

Hall Environmental Analysis Laboratory received 2 sample(s) on 8/22/2020 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **2008C42**
Date Reported: **9/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd. **Client Sample ID:** BS20-11 2'
Project: Grama Ridge East 34 **Collection Date:** 8/20/2020 11:03:00 AM
Lab ID: 2008C42-001 **Matrix:** SOIL **Received Date:** 8/22/2020 8:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	18	8.9		mg/Kg	1	8/28/2020 3:41:05 PM
Motor Oil Range Organics (MRO)	62	45		mg/Kg	1	8/28/2020 3:41:05 PM
Surr: DNOP	113	30.4-154		%Rec	1	8/28/2020 3:41:05 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	180	60		mg/Kg	20	8/29/2020 6:18:08 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.024		mg/Kg	1	8/26/2020 4:17:47 AM
Toluene	ND	0.048		mg/Kg	1	8/26/2020 4:17:47 AM
Ethylbenzene	ND	0.048		mg/Kg	1	8/26/2020 4:17:47 AM
Xylenes, Total	ND	0.096		mg/Kg	1	8/26/2020 4:17:47 AM
Surr: 1,2-Dichloroethane-d4	98.0	70-130		%Rec	1	8/26/2020 4:17:47 AM
Surr: 4-Bromofluorobenzene	105	70-130		%Rec	1	8/26/2020 4:17:47 AM
Surr: Dibromofluoromethane	109	70-130		%Rec	1	8/26/2020 4:17:47 AM
Surr: Toluene-d8	97.8	70-130		%Rec	1	8/26/2020 4:17:47 AM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	8/26/2020 4:17:47 AM
Surr: BFB	106	70-130		%Rec	1	8/26/2020 4:17:47 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit
P	Sample pH Not In Range
PQL	Practical Quanitative Limit
RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix

Analytical Report
Lab Order **2008C42**
Date Reported: **9/1/2020**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resource Group Ltd.
Client Sample ID: BS20-12 1.5'
Project: Grama Ridge East 34
Collection Date: 8/20/2020 11:39:00 AM
Lab ID: 2008C42-002 **Matrix:** SOIL
Received Date: 8/22/2020 8:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **BRM**
Diesel Range Organics (DRO)	26	8.9		mg/Kg	1	8/28/2020 4:05:12 PM
Motor Oil Range Organics (MRO)	70	45		mg/Kg	1	8/28/2020 4:05:12 PM
Surr: DNOP	121	30.4-154		%Rec	1	8/28/2020 4:05:12 PM
EPA METHOD 300.0: ANIONS						Analyst: **JMT**
Chloride	160	60		mg/Kg	20	8/29/2020 6:30:33 PM
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **JMR**
Benzene	ND	0.024		mg/Kg	1	8/26/2020 4:46:16 AM
Toluene	ND	0.048		mg/Kg	1	8/26/2020 4:46:16 AM
Ethylbenzene	ND	0.048		mg/Kg	1	8/26/2020 4:46:16 AM
Xylenes, Total	ND	0.096		mg/Kg	1	8/26/2020 4:46:16 AM
Surr: 1,2-Dichloroethane-d4	99.1	70-130		%Rec	1	8/26/2020 4:46:16 AM
Surr: 4-Bromofluorobenzene	102	70-130		%Rec	1	8/26/2020 4:46:16 AM
Surr: Dibromofluoromethane	108	70-130		%Rec	1	8/26/2020 4:46:16 AM
Surr: Toluene-d8	97.6	70-130		%Rec	1	8/26/2020 4:46:16 AM
EPA METHOD 8015D MOD: GASOLINE RANGE						Analyst: **JMR**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	8/26/2020 4:46:16 AM
Surr: BFB	101	70-130		%Rec	1	8/26/2020 4:46:16 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit
P	Sample pH Not In Range
PQL	Practical Quanitative Limit
RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2008C42**
01-Sep-20

Client: Vertex Resource Group Ltd.
Project: Grama Ridge East 34

Sample ID: **MB-54781**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBS**	Batch ID: **54781**	RunNo: **71481**							
Prep Date: **8/29/2020**	Analysis Date: **8/29/2020**	SeqNo: **2496084**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-54781**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSS**	Batch ID: **54781**	RunNo: **71481**							
Prep Date: **8/29/2020**	Analysis Date: **8/29/2020**	SeqNo: **2496085**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	94.8	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2008C42**
01-Sep-20

Client: Vertex Resource Group Ltd.
Project: Grama Ridge East 34

Sample ID: **LCS-54670**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**							
Client ID: **LCSS**	Batch ID: **54670**	RunNo: **71390**							
Prep Date: **8/25/2020**	Analysis Date: **8/26/2020**	SeqNo: **2492006**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	51	10	50.00	0	102	70	130			
Surr: DNOP	4.1		5.000		81.6	30.4	154			

Sample ID: **MB-54670**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**							
Client ID: **PBS**	Batch ID: **54670**	RunNo: **71390**							
Prep Date: **8/25/2020**	Analysis Date: **8/26/2020**	SeqNo: **2492010**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	9.6		10.00		96.1	30.4	154			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2008C42**
01-Sep-20

Client: Vertex Resource Group Ltd.
Project: Grama Ridge East 34

Sample ID: **lcs-54644** SampType: **LCS4** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **BatchQC** Batch ID: **54644** RunNo: **71358**
Prep Date: **8/24/2020** Analysis Date: **8/25/2020** SeqNo: **2490933** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.93	0.025	1.000	0	92.9	80	120			
Toluene	0.96	0.050	1.000	0	95.6	80	120			
Ethylbenzene	0.99	0.050	1.000	0	98.8	80	120			
Xylenes, Total	3.1	0.10	3.000	0	102	80	120			
Surr: 1,2-Dichloroethane-d4	0.49		0.5000		97.4	70	130			
Surr: 4-Bromofluorobenzene	0.51		0.5000		102	70	130			
Surr: Dibromofluoromethane	0.55		0.5000		110	70	130			
Surr: Toluene-d8	0.49		0.5000		97.0	70	130			

Sample ID: **mb-54644** SampType: **MBLK** TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS** Batch ID: **54644** RunNo: **71358**
Prep Date: **8/24/2020** Analysis Date: **8/25/2020** SeqNo: **2490934** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 1,2-Dichloroethane-d4	0.52		0.5000		104	70	130			
Surr: 4-Bromofluorobenzene	0.49		0.5000		99.0	70	130			
Surr: Dibromofluoromethane	0.57		0.5000		115	70	130			
Surr: Toluene-d8	0.50		0.5000		100	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **2008C42**
01-Sep-20

Client: Vertex Resource Group Ltd.
Project: Grama Ridge East 34

Sample ID: **lcs-54644**	SampType: **LCS**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **LCSS**	Batch ID: **54644**	RunNo: **71358**
Prep Date: **8/24/2020**	Analysis Date: **8/25/2020**	SeqNo: **2490993** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	22	5.0	25.00	0	86.3	70	130			
Surr: BFB	500		500.0		100	70	130			

Sample ID: **mb-54644**	SampType: **MBLK**	TestCode: **EPA Method 8015D Mod: Gasoline Range**
Client ID: **PBS**	Batch ID: **54644**	RunNo: **71358**
Prep Date: **8/24/2020**	Analysis Date: **8/25/2020**	SeqNo: **2490994** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	500		500.0		99.2	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: clients.hallenvironmental.com

Sample Log-In Check List

Client Name: Vertex Resource Group Ltd. Work Order Number: 2008C42 RcptNo: 1

Received By: **Juan Rojas** 8/22/2020 8:50:00 AM

Completed By: **Juan Rojas** 8/22/2020 10:58:02 AM

Reviewed By: 8/22/20

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Courier		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. Received at least 1 vial with headspace <1/4" for AQ VOA?	Yes ☐	No ☐	NA ☑
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)

Adjusted? _____

Checked by: JR 8/22/20

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	0.4	Good				
2	0.3	Good				

Chain-of-Custody Record

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Client: Vertex

Mailing Address: on file

Phone #:

email or Fax#:

QA/QC Package:

☐ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance

☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time: 5 Day Turn

☒ Standard ☐ Rush

Project Name: Grama Ridge East 34

Project #: 20E-00504-002

Project Manager: Natalie Gordon

Sampler: Kevin Smith

On Ice: ☒ Yes ☐ No

# of Coolers: 2

Cooler Temp(including CF): 0.4-0=0.4 (°C) 0.3-0=0.3

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2005C42
8/20/20	11:03	Soil	BS20-11 2'	4oz jar	ICE	-001
8/20/20	11:39	Soil	BS20-12 1.5'	4oz jar	ICE	-002

Analysis Request

BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)
X	X					X			
X	X					X			

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
					8/21/20	1100
8/21/20	1900			courier	8/22/20	8:50

Remarks: Send report to Natalie Gordon

Bill Vertex

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 11381

CONDITIONS OF APPROVAL

Operator:			OGRID:	Action Number:	Action Type:
3BEAR FIELD SERVICES, LLC	1512 Larimer St, Suite 540	Denver, CO80202	372603	11381	C-141

OCD Reviewer	Condition
rmarcus	None